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The Effects of Varied Pre-experimental Environments on Open Field Behavior and Elevated Maze Learning in the Rat

Herbert C. Hayward
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Herbert C. Hayward entitled "The Effects of Varied Pre-experimental Environments on Open Field Behavior and Elevated Maze Learning in the Rat." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

W. O. Jenkins, Major Professor

We have read this dissertation and recommend its acceptance:

Ernest Furchgott, Roy R. Schrader

Accepted for the Council:
Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

May 25, 1956

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We have read this thesis and recommend its acceptance:

Ernest Furcht

Sam Selby

Francis Harris

Ray L. Shrader

Accepted for the Council:

C. A. Watters
Dean of the Graduate School

THE EFFECTS OF VARIED PRE-EXPERIMENTAL ENVIRONMENTS ON OPEN FIELD BEHAVIOR AND ELEVATED MAZE LEARNING IN THE RAT

A THESIS

Submitted to
The Graduate Council
of
The University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Doctor of Philosophy

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by
Herbert C. Hayward

June 1956

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CHAPTER I

INTRODUCTION

This study was an effort to evaluate the effect or effects of pre-experimental treatment upon the subsequent behavior of white rats of two strains in the presence of stimulus change during the experiment. Two articles in the Psychological Bulletin (2, 9) have pointed up the importance of such studies for the science of psychology.

Chronologically the first of the two articles was that of Christie (9). He stressed the importance of controlling the pre-experimental environment of Ss, because of difference in performance which he found in rats learning mazes. He felt that the only differentiating variable explaining performance differences was on the dimension of opportunity for exploratory behavior in the pre-experimental period and not connected with the testing situation itself. Consequently, he wrote that ". . .it is the responsibility of the theorist to demonstrate that the principles uncovered in the study of rats with a restricted background are applicable to the behavior of rats reared under more varied environmental conditions" (p. 335).

The second article, by Beach & Jaynes (2), was a review of the literature concerned with the effects of early experience upon animal behavior in adulthood. The authors conclude their review with two conclusions:

1. It is of basic importance to the science of psychology and animal biology that the effects of early experience be spelled out more adequately with controlled studies.

2. That much of the evidence available at present is equivocal and of undetermined reliability.

One conclusion from a symposium concerned with the effects of early experience on mental health (44) also has pointed up the need for experimental studies to test hypotheses derived from descriptive data.

In a field such as psychology, in which the scope of study covers both animal and human species, investigations of the effects of early conditions on adult behavior in humans were found to be few in number (38). The results were inconclusive or not in agreement with the comparative literature (40). Thompson (40) suggested that a major factor in the lack of agreement between animal and human studies was that, in the latter, measurements were made too soon after the experimental treatment. Orlansky (35) pointed out the difficulties in investigations of human behavior in this area and the obvious lack of control for the E of the variables in the usual human environment. However, it has been shown (12) that much of the theorizing in psychoanalytic literature (35, 38) was dependent upon assumed influences of infant experience upon adult behavior.

It was the view of this writer that data from comparative experiments could offer suggestions and interpretations for greater understanding of human behavior if personality was regarded as founded upon learned adjustments.

Investigations of the relationship between early experience and adult behavior in animals have followed the necessary design wherein

the Ss' external environment was modified in early life with measurement on a response dimension sometime after the Ss' exposure to the controlled stimulus change (2). This study was an attempt to provide additional data bearing on the effects of pre-experimental treatment upon selected behavior of the white rat.

Survey of the Literature

A survey of the literature appropriate to this study was made by considering primarily those studies in which the pre-experimental conditions were known or varied and the effects were then measured in certain experimental conditions. All studies were eliminated in which different investigators in two laboratories obtained divergent results when performing essentially the same experiment. In the preceeding case it might be hypothesized that the pre-experimental histories of the Ss were different, but this latter was not specified. Furthermore, this study is limited to infra-human Ss.

The effects of pre-experimental history on learning, emotionality, exploratory behavior and weight will be reviewed. Before considering these areas it would seem appropriate to define the term deprivation which occurs frequently in connection with studies of this nature. The term "deprivation" has been most frequently applied to the removal of food and water for a period of time; however, one may also consider "deprivation" as the absence of certain external stimuli which are present in the life space of some animals, but not in that of others.

Learning

Many types of apparatus including enclosed alley mazes, Hebb-Williams closed field test, elevated mazes, discrimination problems, etc., have been used by different investigators.

A study by Griffiths & Stringer (18) has shown that the effects of intense stimulation (ECS, auditory, temperature, etc.) during infancy does not measurably effect adult behavior in the learning of maze patterns or discrimination problems. Bingham & Griffiths (7) found significant differences in Warner-Warden maze performance in favor of rats given wide environmental stimulation as compared to rats raised in squeeze boxes or "ordinary" laboratory cages. The superiority in maze learning of animals with enriched environmental histories was found in several experiments by Hebb and his colleagues at McGill University (11, 13, 14, 23, 28, 31, 39, 40). These findings are interpreted as supporting the theoretical concepts of Hebb (24) which depend upon early perceptual learning as a basis for later learning in that neurological phase sequences are formed which serve as perceptual elements for future learning.

The effects of cue change, generalization or generalization decrement, seemingly play an important role in many of the studies. Christie (9) found that rats which had been deprived of food and water in infancy did better in locating food and water in a maze than controls. Here the behavior of the deprived rat may have been generalization of the Ss having learned to "look for" food and water in their absence during the deprivation period. Similarily, it was found in another study (36)

that rats raised in larger cages will explore more; they may have been generalization of movement from an environment that facilitated learning movement in space.

Bernstein (5) varied the amount of handling received by rats pre-experimentally and through the completion of experimental procedures. He had three groups: a. EH, handled for 10 minutes per day from weaning on; b. IH, handled for 10 minutes per day starting at 50 days of age and continuing until the time that the experiment started when all Ss were 60 days of age; c. NH, not handled at all. His data for original learning of the response of going to the lighted side of a T-shaped discrimination box shows superiority of the EH group on number of trials to learn and number of errors; followed by IH, and, last, NH. During 40 extinction trials the EH and NH Ss were separated into four groups; one-half of the EH received no handling and one-half of the NH received the handling of the usual EH group. On extinction trials he found that Ss with whom the pre-experimental and learning trial relationship had been interrupted made more errors than the NH rats what were not changed under extinction. Introducing environmental change during extinction appears to have established for the interrupted animals sufficient generalization decrement to raise their error scores above all other groups.

The McGill studies on the effects of enriched environment versus restricted environments further illustrates the point. The continuum of environmental enrichment included the mere increasing of the size of the cage (36), or increase in handling (37), or the rearing of Ss as pets

in private homes (11). In the enriched environment the animal has the opportunity for motor activity and sensory experience with items somewhat similar to those found later in testing. The enriched animal, therefore, did have more opportunity for learning pre-experimentally that generalized to later testing. At the same time the deprived animal was placed in the testing situation with an environment of greater dissimilarity and complexity compared to the restrictive cages with consequent increase in the disruption of his habit patterns leading to generalization decrement of previously learned responses.

The experiment of Griffiths & Stringer (18) may be viewed as an instance when infantile experience did not generalize to facilitate or handicap adult performance on the responses measured, but it should be noted that the treatment and test situations were radically different.

Forgus (14, 15) pre-experimentally subjected rats to environments of varying visual-motor complexity and then measured these Ss on tests varying across the same dimensions. He found that Ss raised in deprived environments do better on problems in which stimulation was minimal. In the more complex problems the Ss from the more complex pre-experimental environment were superior. He concluded that there seemed to be a relationship between the quality of early experience and the demands of the problem which is central to the issue of developmental studies in the area under review in this section.

In summary the experiments on enriched pre-experimental histories versus deprivation histories indicate that organisms that have had the opportunity for specific learning when young will show superior

performance if the dimension being measured in later life benefits through generalization.

Emotionality

The term "emotionality" has been used frequently in connection with defecation and urination which occur when the S is placed in a strange situation and such elimination disappears over time of exposure to the new stimulus (21). For purposes of this study emotionality has been considered as the change in the Ss observable excitement level when the Ss are in the presence of any new stimulation, i. e., measurable changes in activity regardless of whether more or less, but reserving locomotor type behavior for the review section on exploration.

Several experiments at McGill University (11, 30, 31, 39, 40) have shown that restricting the environment of dogs pre-experimentally will produce significantly more "freezing" and crouching behavior in the free field as compared to non-restricted controls. Clarke, et al. (11), report differences between three Scottish terriers raised as house pets and three raised as restricted laboratory animals. When measured in a strange environment as adults the reduced stimulation dogs displayed, in contrast to controls, "freezing", hugging the floor and staring forward, and behavioral "anesthesia" to a hypodermic needle. Melzack (31) indicates that in the dog significant differences in the nature of emotional responses were found; diffuse emotional reactions for restricted dogs in which the whole body participated in a response, and avoidance reactions of a ". . .selective, clearly adaptive movement

. . ." (p. 167). He concludes, in part, that the similarity between pre-experimental and experimental environments is a determiner of the degree to which an organism is disturbed by innocuous, emotion-provoking objects.

Griffiths & Springer (18) did not find that intense stimulation (ECS, auditory, temperature, etc.) during infancy affected emotionality as measured by elimination when Ss were adults; however, Hall & Whiteman (22) report that subjecting young mice to intense auditory stimulation produced an increase in elimination responses as compared to controls when the experimental Ss were placed in the same setting as adults without the auditory stimulus present.

Beach & Jaynes (2) have described the Hall findings of "emotional instability" in the experimental group as the possible conditioning of the elimination response to the experimental setting. Another possible explanation is that the experimental Ss' increased elimination was a function of generalization decrement for the elimination response increase may have come about as a result of the change in the stimulus compound, for the experimentals, when the previously associated auditory stimulus was not part of the field situation when it was entered in adulthood. The ease of establishing infantile association in the mouse has been shown by Fredericson (17) who found that one trial exposure to aggression in infancy conditioned aggressive behavior in the adult mouse. The underlying genetic factors should be noted that have been found which influence such behaviors (29, 44).

Hunt & Otis (27) varied the pre-experimental dimension of handling and found that reduced stimulation Ss, non-handled, significantly did not emerge from a stove pipe situation in contrast to controls. The emerging test followed open field trials in which no differences in emotional elimination were found.

Weininger (42) assessed physiological damage to rats under emotional stress as a function of pre-experimental handling or gentling. Separating his Ss into control and experimental groups at weaning, E gentled the experimentals 10 minutes a day for 21 days; the controls were not handled. Three weeks after weaning weekly weights were recorded until the experiment ended, and experimentals consistently showed significantly greater mean weights. At 58 and 65 days Ss were introduced into a brilliantly lighted open field. Experimentals showed less thigmotaxis, light avoidance, and, on first trial, significantly less grid entries in the open field. At 79 days each S was immobilized and placed "on its back" for 48 hours under food and water deprivation.

Autopsies revealed less damage to cardiovascular and gastrointestinal systems, and lighter adrenal glands for the experimentals. The author concluded that the greater weight of the adrenals for the non-handled Ss was a function of more ACTH being released under stress and that observed internal damage resulted from the end product of the action of ACTH from the pituitary in releasing hormones from the adrenal cortex.

Ruegamer, et al. (37) varied the pre-experimental handling of albino rats living in both isolate and colony conditions. Findings were significantly better growth and utilization of food for extra-handled Ss.

The authors found the thyroids of the non-handled Ss in a more active state, and felt that the increased thyroid activity may be an important mediating factor in the production of the differences in growth and food utilization.

In summary the experiments on varied pre-experimental histories indicate that reduced stimulation environments can result in changes in the adult animal's emotional behavior as a resistance to stress resulting from stimulus change in adulthood. Broadly two types of studies have been reviewed in this section: a. those that varied the overall environments of Ss and found the group with reduced stimulation histories reacted to stimulus change with observable behavior patterns described as emotional when compared to controls; b. those studies that varied the E's contact handling of Ss, and measured, primarily, the physiological changes that occurred, these indicated less internal stress for the handled Ss.

Exploratory Behavior

Exploratory behavior was defined for purposes of this review and experimentation as that locomotor behavior which is aroused by stimulus change and which ultimately declines as a function of time of exposure to stimulus constancy. Forward going behavior and rearing were considered as the two major observable aspects of the presence of exploratory behavior in the white rat. In the main, studies of exploratory behavior have employed, as does this study, a modification of the Hall open field test.

Weininger (42) has shown that on the first trial in open field tests the non-handled rat wandered over the grid more than controls, but significance data are not given; it was also found that controls showed significantly less wall hugging tendencies.

Clarke, et al. (11) found that amount of exploration by restricted dogs was dependent upon the testing environment. They found that restricted dogs explored more than normals in a familar situation; and in an unfamilar one their level of activity, while being initially about equal to that of normals, fell off at a much slower rate with repeated exposure to the situation. Thompson & Heron (39), however, found that restricted dogs were hyperactive as compared to non-restricted Ss when released from restriction; however, no data were given for exploration measures. The same authors (40) concluded in another study that dogs restricted in early life explored significantly more than controls on both indoor and outdoor field tests.

Montgomery (33) has shown that pre-experimental activity wheel experience exerts no effect of any kind upon exploratory behavior of rats in a simple maze as compared to rats with no activity wheel experience.

Bernstein (5) found little or no exploratory behavior in unhandled rats, while handled Ss were described as very active in investigatory behavior. Christie (9) reports that rats whose pre-experimental history included exploratory behavior were superior on elevated mazes to non-experienced Ss and showed a greater tendency to explore.

A study by Berlyne (3) and one by Campbell & Sheffield (8), although not studies of pre-experimental histories, are pertinent to this review. Berlyne used naive rats raised in colony cages and found cautiousness of movement and excessive urination and defecation followed by feverish exploration in the presence of strange objects. His work led to the postulating of a curiosity drive which was aroused by novel stimuli. He also found spontaneous recovery of exploration after elapsed time away from testing, and this has been supported by Montgomery (32).

Campbell & Sheffield investigated the relationship of random activity to food deprivation. They found that an environmental change consistently produced an increase in activity significantly above the slight increase in random activity yielded by food deprivation alone. They concluded that drives involve lowered thresholds to external stimulation, and the animal becomes more responsive to environmental changes; further, the presentation of novel stimuli to an organism interacts with drive to produce an increment in gross movement.

In summary the studies reported here are not clear cut. Weininger found the unhandled rat more active, but Bernstein did not. Christie suggested maze exploration differences in his Ss was due to pre-experimental exploratory experiences. Clarke, et al. suggested that the amount of exploration for restricted Ss was dependent upon the familarity of the environment. Thompson & Heron report greater activity for restricted Ss.

Weight

In the experiments in which pre-experimental environments were manipulated and weight recorded in adulthood the findings were consistent. Bernstein (5) equated groups of albino rats for weight at weaning and found at the age of 46 days the extra-handled Ss had significantly greater mean weight gain than unhandled Ss. Ruegamer, et al. (37) report the same findings for handled and nonhandled Ss at five weeks after weaning. Weininger (42), varying handling of pure Wistars, weighed the animals weekly from 44 through 81 days of age and found consistent differences in favor of heavier weight for handled Ss. Thompson & Heron (39) with no statistical analysis given, reported that the mean weight of non-restricted Scottish terriers (15.6 lb.) was greater than that of restricted Ss (14.7 lb.).

Of the areas reviewed above, learning and weight gain seem to be consistently in the direction of superior learning and more weight gain for non-restricted animals as compared to the restricted. In studies of emotionality it seems that unhandled or restricted animals are more emotional or that the data show no differences. It is in the area of exploratory behavior that the Beach & Jaynes (2) conviction of equivocal findings in developmental studies is directly applicable to this review.

The reaction of the animals to novel stimulation lies on a continuum from an increase in locomotion to "freezing". The latter behavior may be defined as that response in which forward going behavior ceases, crouching and trembling may occur, and elimination may be seen.

In this regard, Hunt & Otis (26) suggest crouching and freezing as more sensitive indicators of emotional responses to novel stimuli. This review supports the position that when either emotional behavior or exploratory behavior is under investigation, measures of both should be reported.

Recently the areas of emotions and exploratory behavior have been subjects of theoretical analyses. Hebb (25) writes ". . .it has been clear for some time that we must add an exploratory drive. . ." (p. 245) in discussing the concept of emotion.

Berlyne (3) offers a Hullian concept of a curiosity drive aroused by novel stimuli; however, it seems to the present writer a contradiction in terms to postulate a curiosity drive with an attendant response of no movement as would be the case with freezing. A further drive could be postulated that would be aroused in the face of strong stimulation and would tend to cover up or inhibit the exploratory drive responses. This may be what Berlyne was suggesting when he wrote that the more stronger stimulation elicits fear which is identified as withdrawal, and a weaker stimulus elicits the curiosity drive which leads to exploration.

Hebb (25) writes at length regarding drives and the conceptual nervous system basing much of his treatment on the McGill University studies and Berlyne's work reported in the above review. He states that the important distinction in evaluating response levels is between cue function and arousal function in the effects of a sensory event. The cue function is that of guiding behavior and the arousal function is

that of energizing behavior.

For Hebb the arousal system is ". . .synonymous with the general drive state. . ." (p. 244); and learning is dependent on drive, i. e., if there is no arousal there is no learning. The cortical bombardment of the arousal system is non-specific and may be at varying levels; when it is low an increase in bombardment will tend to strengthen or maintain concurrent cortical activity, and the response that produces increased cortical stimulation and greater arousal will tend to be repeated; when arousal is at a high level the greater bombardment may interfere with the cue function. There will be an optimal level of arousal for effective behavior.

Under this view, emotions resulting from the presentation of a new stimulus energize and organize responses up to the optimal level of arousal, but beyond that level there will be extreme loss of adaption or disturbance of cue functions and S-R relations. Thus exploration would be reaction to stimulus change when the arousal system was at or below optimal levels; and lessening of activity (freezing) would be the reaction to stimulus change when the arousal system was beyond optimal levels.

Following the need reduction theorizing of Berlyne, Hebb concludes that at low levels of arousal an increase in drive intensity may be rewarding, whereas at high levels it is a decrease that rewards. He feels that the necessity of including an "exploratory-curiosity-manipulatory drive" may be reduced to a tendency for an organism to seek varied stimulation as a function of the arousal system.

Hebb's view should differ from the Campbell & Sheffield conceptualization on the important dimension of the role of external stimulation and consequent generalization decrement in the face of stimulus change. Hebb postulates the need to seek varied stimulation as energized by the arousal system; but Campbell & Sheffield would predict little change in activity in an animal in a drive state unless there was some unusual external stimulation already present.

Statement of the Problem

The purpose of this study was to investigate the effects of different early environments on learning, exploration, and emotionality in the white rat.

The independent variables which were manipulated were opportunity for visual stimulation, size of home cage, and presence of cage mates. In addition, testing of two different groups of rats may have introduced a genetic variable.

Animals were tested under two conditions: a. in an open field, and b. on an elevated maze in that order.

Most responses measured in the open field were classed under gross and fine movements responses. This dichotomy was chosen to facilitate measurements and interpretations.

Gross movement responses were those of grid entries and rearing. In both of these responses the whole body of the rat appears to be involved in the response.

Fine movement responses were those of defecation, grooming, and number of seconds spent in inertness. These responses did not appear to this observer to involve the gross motor involvement of locomotion or rearing, nor did they appear to be oriented to external stimulation as directly.

Hypotheses

Open field. Responses were divided into three types: gross movement, fine movement, and undetermined. Gross and fine movement responses were the behaviors cited previously. Undetermined actions were head bobbing and number of periods of inertness. No predictions were made for undetermined responses.

Viewing, as has been done in this study, the presentation of any new stimulus to an organism as being an instance preceded by the deprivation of that stimulus, then the first entrance of a S into the open field is a case of an organism who was open-field deprived and who is face to face with a group of stimuli which will raise the excitement level of the organism and will be followed by an increase in the gross movement responses.

It was predicted that the introduction of the reduced stimulation Ss into the open field will result in heightened excitement level as measured by the observable behavior of an increase in number of grid entries as compared to animal room Ss, who had a "normal" environment.

It was predicted that the introduction of isolation cage Ss into the open field will result in heightened excitement level as measured by an increase in number of grid entries as compared to

colony cage Ss.

These predictions were based on the hypothesis that those Ss who have had pre-experimentally the greater opportunity for behavior triggered by stimulus change, i. e., animal room Ss and colony cage Ss, will be affected, as measured on the gross movement-fine movement continuum, than Ss from environments with less stimulus value. The assumption is that the environment producing more stimulus change experiences will result in less generalization decrement for Ss of that environment when faced with novel stimuli.

Elevated maze. It was predicted that the animal room Ss would be superior on elevated maze performance to reduced stimulation Ss, and that the colony cage Ss would be superior to the isolation cage Ss. It was predicted that the performance superiority would be measured by number of correct trials and total maze time.

These predictions were based on the assumption that the Ss performing best on the elevated maze would be those Ss who had had the greater pre-elevated-maze stimulus history, and would profit, therefore, from generalization of cage learning to the open field and elevated maze. Further, it was predicted that the more adaptive behavior of the animal room and colony cage Ss in the open field would result in learning that would facilitate through generalization the superior performance of these groups on the elevated maze.

Late treatment group. The late treatment group was considered a special case. It was assumed that the stimulus change of going from the animal room environment to the reduced stimulation room late in the

Ss' pre-experimental history would be more disruptive of established habit patterns than such a change at weaning, the case for reduced stimulation Ss, when the body of established habit patterns would not be as large or as well stamped into the Ss' response organization. It was predicted that on both open field tests and elevated maze tests the late treatment group would show more adverse effects of reduced stimulation and isolation than other groups.

No predictions were made for mean weights of the groups.

CHAPTER II

SUBJECTS, METHODS, AND PROCEDURE

Subjects

In this study seventy-two white male rats were used. All were Wistars; thirty-nine were from the Home Economics colony of the University of Tennessee, originally from a Wistar strain, and are identified in this study as UT Ss; thirty-three were from the Red Bank Laboratories, New Jersey, and are identified as RB Ss. During the pre-experimental period three UT and two RB Ss died from undetermined causes.

All Ss were obtained as close to weaning as possible; for the UT Ss this was the same day as weaning, and for RB Ss it was not more than four days later. At the time of the arrival of Ss at the University of Tennessee animal laboratory they were assigned to groups in a counter balanced order and placed under their respective pre-experimental condition.

Pre-experimental Conditions

Two major environmental conditions were employed. One was the normal animal room environment of the University of Tennessee Laboratory, and the second a reduced stimulation room especially prepared for this study. Ss remained under these conditions from the time of original placement at weaning to the last elevated maze trial.

Animal room (AR). Constant illumination was provided from a diffused overhead source giving an 0.8 reading on the low light scale of the Weston exposure meter, Model 735. This reading, as all others

reported, was based on the reflection value of a Sargent filter #501 six inches from the meter and at the level of the animal cages.

Colony groups were placed upon tables and isolate cages upon shelves. These cages were rotated weekly within groups to avoid differential stimulation value of cage position relative to the room per se. No effort was made to separate the general area for Ss of this experiment from other rats in the animal room.

Ventilation was maintained through exhaust fans and heating by electric heaters. The temperature range was from 70 to 80 degrees Farenheit except for the last month of experimentation when during the day temperatures fluctuated from a low of 70 to a high of 90.

Reduced stimulation room (RS). The reduced stimulation room (RS) adjoined the animal room (AR). Illumination was reduced to a point such that no reading was possible at cage positions on the low light scale of the exposure meter. Incident light came during the day from a shaded window. A light shield was placed two feet in front of the window to further diffuse the light. During the night, light filtered through a one inch opening below the door. Under neither condition was it possible for direct light to strike the cage positions.

Cages for Ss were on wooden tables. Each cage, isolate or colony, was enclosed in a cardboard tube thirty-six inches high and three inches larger in diameter than the cage. The tubes greater diameter than the cage and the spiral wrapping of the cardboard provided an open end that offered adequate ventilation but served as a light baffle and acoustical barrier. All cages had solid tops. The room used was as far away from

auditory stimuli as was possible; however, all noise could not be eliminated.

Within the two major experimental conditions Ss were assigned to the sub-groups that are discussed in a later section.

Feeding and cage cleaning. Water was constantly supplied to cages through a drip bottle supported outside the cage but within the cardboard tube. One bottle was available for each S. Animals were maintained ad libitum on Purina Chow pellets until fifteen days previous to the testing period when all Ss were placed on a diet of ten grams per day. Until the reduced daily rations started Ss were fed every three days through cage openings of approximately pellet size.

Cleaning took place every fifteen days. Only the colony group Ss were handled during cleaning. They were placed, one group at a time, in a neutral box. Each group had a separate box and there was no mixing in an effort to reduce cues coming from traces of other animals. Isolate cages were of the self-cleaning type with mesh floors and required no handling of the Ss.

The shields of RS Ss' cages were removed and replaced one at a time for feeding and cleaning. Additional light for cleaning operations came from opening the door of the adjoining animal room approximately four inches. No cages were in the direct path of this light. No additional light was needed for feeding and watering operations.

Pre-experimental Subgroups

The number of Ss in each group and the treatment schedules are given in Table I.

TABLE I

NUMBER OF SUBJECTS IN EACH GROUP AND TESTING SCHEDULE FOR OPEN FIELD AND ELEVATED MAZE

Groups	N	Open Field	Elevated Maze
UT Animal Room Colony (AR-Col)	7	x	x
UT Reduced Stimulation Colony (RS-Col)	4	x	x
UT Animal Room Isolates (AR-Iso)	4	x	x
UT Reduced Stimulation Isolates (RS-Iso)	6	x	x
UT Animal Room Space (AR-Sp)	2	x	x
UT Reduced Stimulation Space (RS-Sp)	2	x	x
RB Animal Room Colony (AR-Col)	4	x	x
RB Reduced Stimulation Colony (RS-Col)	8	x	x
RB Animal Room Isolates (AR-Iso)	4	x	x
RB Reduced Stimulation Isolates (RS-Iso)	3	x	x
RB Late Treatment Colony (LT-Col)	3	x	x
RB Late Treatment Isolates (LT-Iso)	4	x	x
Elevated Maze Controls			
UT Animal Room Colony (MC-Col)	4		x
UT Animal Room Isolates (MC-Iso)	4		x
RB Animal Room Colony (MC-Col)	4		x
RB Animal Room Isolates (MC-Iso)	4		x

Colony groups (Col). Ss in colony groups (Col) lived four to a cage which was fifteen by fifteen inches on its base and fifteen inches in height. The top and side were of quarter-inch mesh. The floor was of galvanized metal and covered with wood shavings to a depth of one inch. The single difference, other than overall AR vs RS conditions, between AR and RS groups was a piece of one inch wood placed atop RS cages to aid in filtering out light.

Isolate groups (Iso). Isolate groups (Iso) lived one to a cage which was nine inches in diameter and seven inches high. Floor and walls were of quarter-inch mesh. A removable pan on the bottom permitted debris removal. The roof was a solid metal lid.

Space groups (Sp). Cages for space groups (Sp) were twelve by twelve by sixteen inches. Walls and roof were of quarter-inch hardware cloth reinforced with two four inch wood slats equidistant apart on each side, back, and top. The floor was of masonite and covered with wood shavings to a depth of one inch. Ss in (Sp) conditions lived one to a cage.

Late treatment (LT). There were two late treatment groups (LT), one Col and one Iso. They were placed in the animal room at the time of their arrival and remained there until thirty days before the open field trials started. Upon reaching the approximate age of seventy days they were placed in the reduced stimulation room of their original Col and Iso cages and under the same conditions as previously described for RS Ss.

Elevated maze controls (MC). The elevated maze control groups (MC) were used to tease out the interaction of open field experience on elevated maze performance. There were four MC groups: two UT groups; one Col, one Iso; and, two RB groups, one Col and one Iso. Conditions were identical to those for AR Col and Iso groups.

Experimental Conditions

Testing started when Ss were approximately one hundred days of age. In the sequence of testing the open field trials were administered first.

Certain general conditions were the same during both open field and elevated maze trials. Illumination values were held identical for each test and were the same as for animal room illumination. Temperature was maintained within the limits of 71 and 76 degrees Fahrenheit by air conditioning or electric heaters. A radio was used as a masking noise and was randomly placed about the room to avoid directional effects. All trials were run at night, and each S was fed thirty minutes after his return to his respective pre-experimental environment. Washing of the field and maze with a weak solution of vinegar and water was done following each trial to prevent tracking.

Open field. The field was a thirty-six by thirty-six inch plywood floor covered with gray oilcloth. The eighteen inch high walls were made from a continuous piece of smooth manila cardboard. The floor was grided by ruled lines to provide thirty-six squares of six inches on each side. There were twenty outside grids, twelve medial, and four inner.

The experimental room walls and floor were painted a dull black, and the ceiling was of unpainted acoustical blocks.

Ss were always placed in the same corner of the field in the same manner at the start of each trial. They were so entered that they faced the center of the field. E recorded the Ss' behavior by watching in an overhead mirror which was out of view for the Ss. The mirror was placed at such an angle as to neither interfere with the overhead illumination of the field nor to cast a reflected hot spot on the field surface.

All Ss but the MC groups received nineteen open field trials of five minutes each. They were on consecutive nights except for a break of eleven days between trials eleven and twelve.

Variables recorded and coding for each variable is given below:

1. Outer grid entries (OG)
2. Medial grid entries (MG)
3. Inner grid entries (IG)
4. Full rears (FR)
5. Partial rears (PR)
6. Head bobbing more than five seconds (HB')
7. Head bobbing five seconds or less (HB-)
8. Washing (W)
9. Scratching (S)
10. Inertness in seconds (I)
11. Number of periods of inertness (FI)
12. Defecation (D)
13. Number of boli (NB)

Four of these variables need clarification. Full and partial rears were differentiated by the angle of the S's body to the floor at the highest point of the rear. In the full rear the S's back was approximately at a ninety degree angle to the floor; any smaller angle was classified as a partial rear. Head bobbing is the commonly called "VTE-ing", but the term "head bobbing" was used to avoid the cognitive implication of VTE in other studies (17). Inertness was used to avoid the emotional implications of "freezing".

Elevated maze. There was an interval of three days between the last open field trial and the first elevated maze trial for all Ss except the MC groups.

A six unit T-maze was employed having a turn pattern of RLLRRL with six choice points. The units were thirty-six inches above the floor level and thirty-six inches long. The path was one and one-half inches wide. A recessed food cup made from a soft drink cap was flush with the surface of the runway at the end of the maze. It was kept filled with wet Purina mash to a level flush with the maze surface.

The experimental room was twenty feet long and eight feet wide. Walls, ceiling, and floor were painted a dull black. The one window and door were light tight.

The behavior of each S was recorded by E from a point five feet to the right rear of the maze starting point. Four daily trials were given for twenty trials or a total of one hundred minutes of maze time, whichever occurred first. No maze adaption period was given.

All non-locomoting Ss were permitted to remain on the maze for twenty minutes each the first two trials, and then were given two fifteen minute trials, two ten, and two five. In this manner one hundred minutes of maze time was used by Ss who did not leave the first section or in any way did not traverse the maze to the goal point.

Eating at the goal point was limited to fifteen seconds. Ss who did not eat or ate less than fifteen seconds were removed when they retraced one half of the goal section.

Observations of the following measures were taken and coding for each variable is given below:

1. Time to leave first section (Tl
2. Total maze time (TT)
3. Choice point errors (CE)
4. Retrace errors (RE)
5. Rearing (R)
6. Stability (slipping, climbing down or falling down from maze,SL)
7. Grooming, (washing or scratching, G)
8. Not eating or eating less than fifteen seconds (NE)
9. Defecation (D)
10. Head bobbing (HB)
11. Number of periods of inertness (FI)

Handling of Ss. All Ss were handled in the manner described and recommended by Munn (34, p. 7). As the testing rooms were separated from the AR and RS rooms, Ss were transported in their home cages to the test situation. Following each open field trial and each block of four elevated

maze trials they were returned to their quarters. Cages were taken individually to the open field situation. To permit twenty minute spacing between trials Ss were taken to the elevated maze tests in their respective subgroups and kept on the floor below a large table until it was time for the S to run a trial. Following each trial the S was returned to his home cage and placed below the table until his next turn.

CHAPTER III

ANALYSES OF DATA

This chapter is divided into four sections in the following order; analyses of open field trials, elevated maze trials, weights for each Ss at the completion of the experiment, and qualitative observations.

Open Field

Trial by trial data for each S's open field performance may be found in Appendix A, Tables XXXV through LXXXVIII.

Of the original fourteen variables six were used to compare groups. Outer, medial, and inner grid entries were combined as one variable, grid entries (GE). This combination was based on the high correlations between the three original measures. The rank correlation coefficient, r', for medial and inner grid entries was .86; r' for the combined medial and inner against outer was .65; both correlations yield a p value of less than .01. The full and partial rears were difficult to separate because E's techniques were not fast enough to handle a series of rearings of both types occurring in rapid sequence; rearing (R) represents the combination. The head bobbing measures, HB' and HB-, are represented by head bobbing (HB); difficulty in separating a series of head bobbings into individual time patterns when they occurred rapidly forced this combination. Washing and scratching appeared most times as the same response and were of too low incidence to be treated independently, they were combined as grooming (G).

Variables discarded for low incidence were jumping, number of periods of inertness, and number of boli.

Statistical techniques used were Alexander's test for trend (1) applied to the overall comparison of AR, RS, and LT groups. Subgroupings, i. e., UT-AR-Col vs UT-AR-Iso, RB-AR-Iso vs RB-RS-Iso, etc., were compared by the Wilcoxon-Mann-Whitney test or the grand median method combined with Fisher's Exact Test for low incidence results (41). Results for defecation were analyzed on an occur or not-occur basis, and FET was applied to the frequencies. Significance levels of p= .20 or less were used for interpretations.

Over-all Treatment Comparisons

Low incidence restricted application of the trend analyses to variables GE, R, HB, and I. The array of means for these variables may be found in Appendix B, Tables CLXXI through CLXXIV.

The Hartley test (41) was used to determine homogeneity of variance. Table II gives the individual deviations from estimation for each variable and all fall below the critical region F_{max}= 2.40.

Grid entries. The essential findings for the frequency of grid entries are presented in Figure 1.

The absence of any sytematic deviation from linearity is shown in the summary of the trend analysis data, Table III, where neither group deviation from estimation, row b, nor overall deviation from estimation, row g, were significant. The basic test for trend is the between group slopes, row d, which yielded a p of .10. In combining rows a, b, and g to yield a new error term, a method suggested by Alexander (1, p. 556)

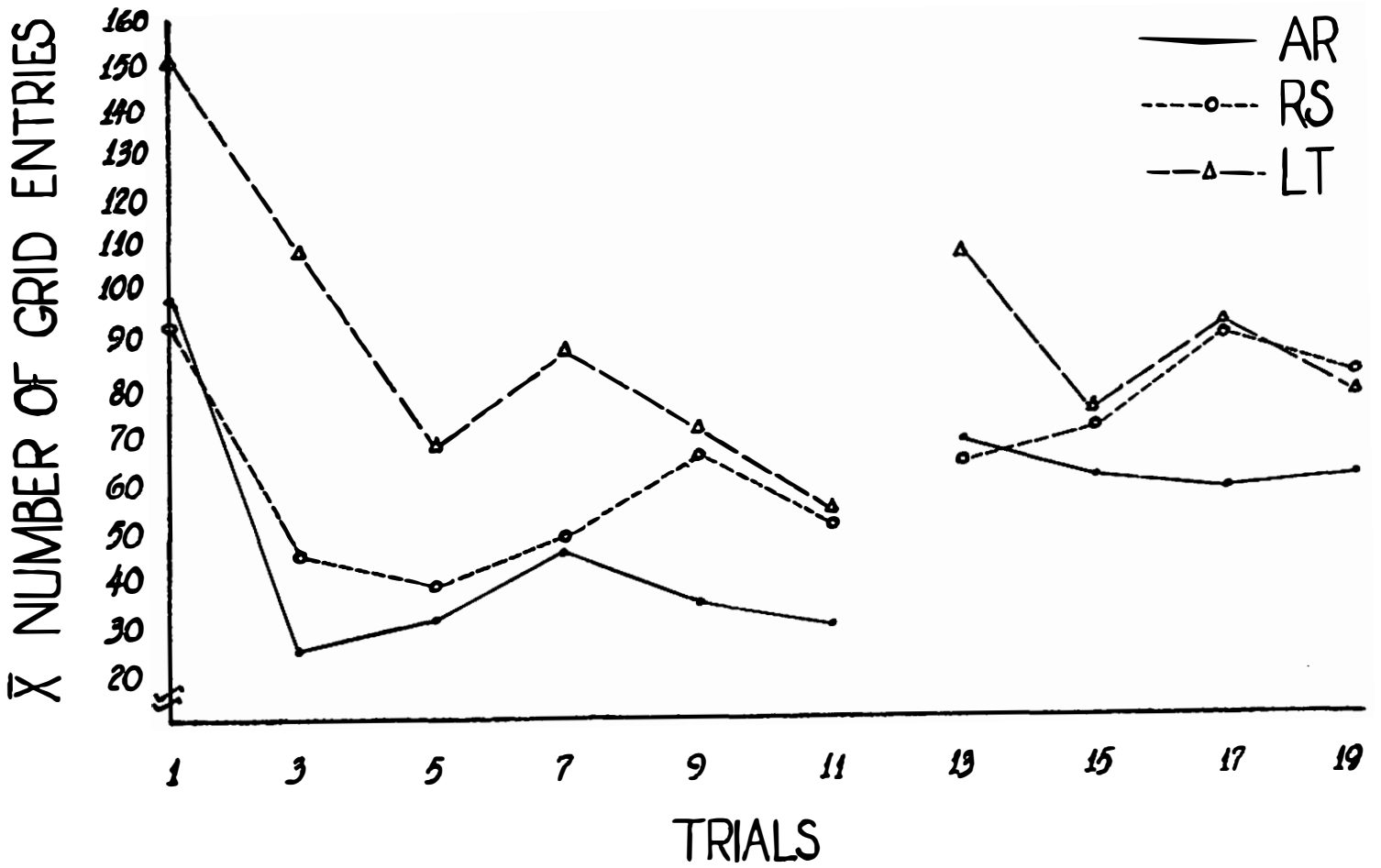

Figure 1. Mean number of grid entries during open field trials for over-all treatment comparisons.

TABLE II

INDIVIDUAL DEVIATIONS FROM ESTIMATION
OF VARIABLES TESTED FOR TREND

			Variables			
Group	N	df	Grid Entries	Rearing	Head Bobbing	Inertness
AR	21	340	1423.32	51.25	18.11	7872.97
RS	23	374	1258.78	30.92	17.25	13314.99
LT	7	102	2299.23	74.61	29.58	17420.13
		F_{max}	1.83	1.45	1.71	2.21

TABLE III

SUMMARY OF ALEXANDER TREND TEST ON FREQUENCY OF GRID ENTRIES FOR OVER-ALL TREATMENT GROUPS

Source of Variation	df	Mean Square	F	P
a. Individual deviations from estimation (error)	816	19211.9		
b. Group deviations from estimation	34	3890.6		
c. Between-individual slopes	48	4876.3		
d. Between-group slopes	2	44639.6	2.32	.10
e. Between-individual means	48	12044.4		
f. Between-group means	2	61268.7	3.19	.05
g. Over-all deviations from linearity	17	15653.6		
h. Over-all slope	1	5879.2		

when rows b and g are not significant, the corrected $F = 2.50$, for a p value just below .10.

A secondary F value of 9.34 was obtained from the ratio of group slopes to between individual slopes ($p = .0001$). The very significant secondary F and the value of the group differences indicate a group component of slope which overrides variations present in individual slopes or individual deviations from linearity.

The between group means, row f, was significant at the .05 point indicating the separation of the groups at the start of trials. Figure 1 shows the LT group started at a much higher response level by a factor of more than one and one-half.

Table IV summarizes the results of the Wilcoxon-Mann-Whitney (WMW) test for the selected blocks of trials; 1, 2-6, 7-11, 12-16, 17-19, and total trials. It would seem that the effect of first animal room or "normal" environment followed by the reduced stimulation environment, thirty days previous to testing for the LT group, produced an initial increase in responding surpassing both AR and RS groups. The LT group showed the most trial-to-trial variability and tended in later trials at times to exceed and at times to be less active than RS groups.

The RS group tended to be significantly more active than the AR group. Although the LT group was even more active than the RS group, because of the large variability in the former, not all the LT-RS comparisons are statistically significant. But on the whole there was consistently the largest activity in the LT group and the least activity in the AR group.

TABLE IV

COMPARISON OF ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ON FREQUENCY OF GRID ENTRIES ACROSS ALL TRIALS OF OPEN FIELD BEHAVIOR

	Trials											
	1		2-6		7-11		12-16		17-19		Total	
Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
AR	88		147		167		296		156		919	
RS	91		231	.16	284	.14	348		268		1216	.05
AR	88		147		167		296		156		919	
LT	158		341		324		395		147		1375	
RS	91		231		284		348		268		1216	
LT	158	.08	341		324		395	.13	147		1375	

The absence of significance for group deviations from estimation in the trend analysis implies that the group deviations from linearity are not significantly different from each other. Following the first trial the differences for AR-RS groups were significant. This implies that the effect of the reduced stimulation environment on the young rat elevates the frequency of grid entries.

Rearing. The essential findings for frequency of rearing are given in Fig. 2. The summary of the trend analysis is presented in Table V. From rows b and c the significance figures, both .001, indicate that there was an overall and subgroup deviation from linearity. From Fig. 2 this is seen as essentially a curve with a high starting point for all three groups, then a rapid descent for AR and RS groups, followed by a gradual increase to the end of trials; for the LT group there is a greater up and down variation but generally the same overall pattern as for the other groups. Row b considered alone indicates that there is a significant difference between the non-linear components of the curve. The ratio of between group means to between individual means yields a p of .001; this indicates that the obvious trends in Table V are supported, for the most part, by the significance levels obtained.

In summary, then, it is difficult to generalize about any group differences in trend. Within each group individual Ss deviate significantly from the group trend. The three groups also have significantly different trends.

Results from the WMW test in Table VI also shows a lack of any systematic difference between the AR and RS groups, but the LT group showed consistently more rearings than the other two groups except for

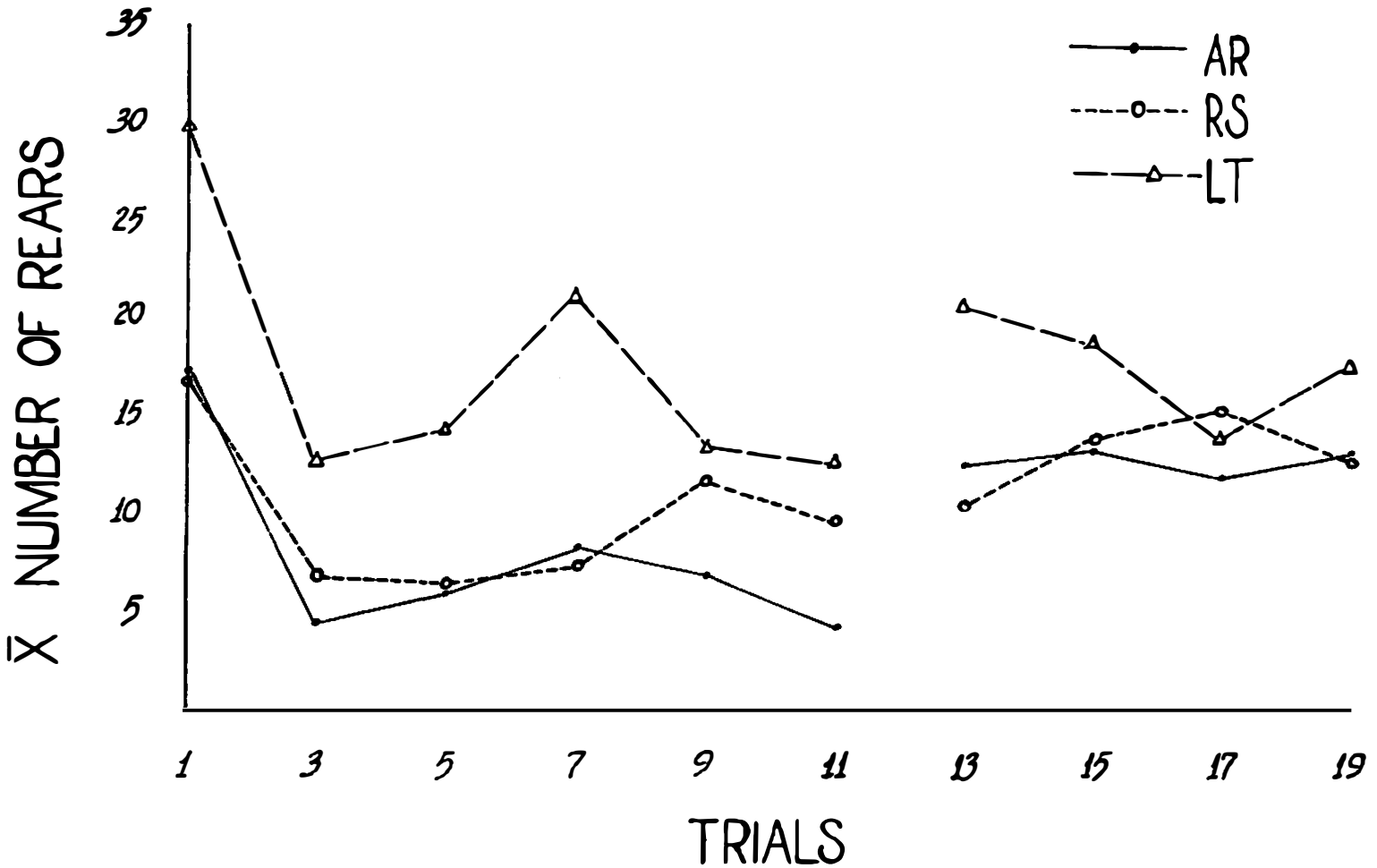

Figure 2. Mean number of rears during open field trials for over-all treatment comparisons.

TABLE V

SUMMARY OF ALEXANDER TREND TEST ON FREQUENCY OF REARING FOR OVER-ALL TREATMENT GROUPS

	Source of Variation	df	Mean Square	F	P
a.	Individual deviations from estimation (error)	816	48.0		
b.	Group deviations from estimation	34	126.4	2.63	.001
c.	Between-individual slopes	48	210.9	4.39	.001
d.	Between-group slopes	2	346.9	7.23	.001
e.	Between-individual means	48	514.2	10.71	.001
f.	Between-group means	2	3908.4	81.42	.001
g.	Over-all deviations from linearity	17	493.1	10.27	.001
h.	Over-all slope	1	1618.1	34.12	.001

TABLE VI

COMPARISON OF ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ON FREQUENCY OF REARING ACROSS ALL TRIALS OF OPEN FIELD BEHAVIOR

	Trials											
	1		2-6		7-11		12-16		17-19		Total	
Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
AR	16		24		29		52		34		180	
RS	15		30		36	.13	44		39		190	
AR	16		24		29		52		34		180	
LT	31		64		58		110		23		304	
RS	15		30		36		44		39		190	
LT	31	.002	64	.05	58		110	.002	23		304	.05

the last three trials. The differences between the LT and AR groups were not statistically significant, but the LT-RS were on blocks 1, 2-6, 12-16, and total. It should be pointed out that the LT group had the highest variability.

The rearing response was the clearest cut distinction between the LT group and the AR and RS groups; the effect of the late treatment environment was more rearing.

Head bobbing. The essential findings for the frequency of HB are given in Figure 2. The trend analysis results are presented in Table VII.

Again, as in the analysis of rearing, the between individual slopes F is significant indicating that within each group the trends for different animals were significantly different. The between group slopes F was also significant showing that the different groups exhibited significantly different trends, and the individual and group means were also significant. In summary, then, it is difficult to generalize about the different changes in the several groups.

The overall slope is significant showing a gradual increase in head bobbings.

The WMW comparisons of Table VIII also support the trend analysis. There was tendency for the AR group to have fewer bobbings than either the RS or LT group. The latter two groups exhibited the greatest variability. Directional differences between the RS and LT groups were not consistent, but the RS had lower overall HB than the LT group.

Inertness. The essential findings for seconds of inertness are given in Fig. 3. The summary of trend analysis of Table IX show

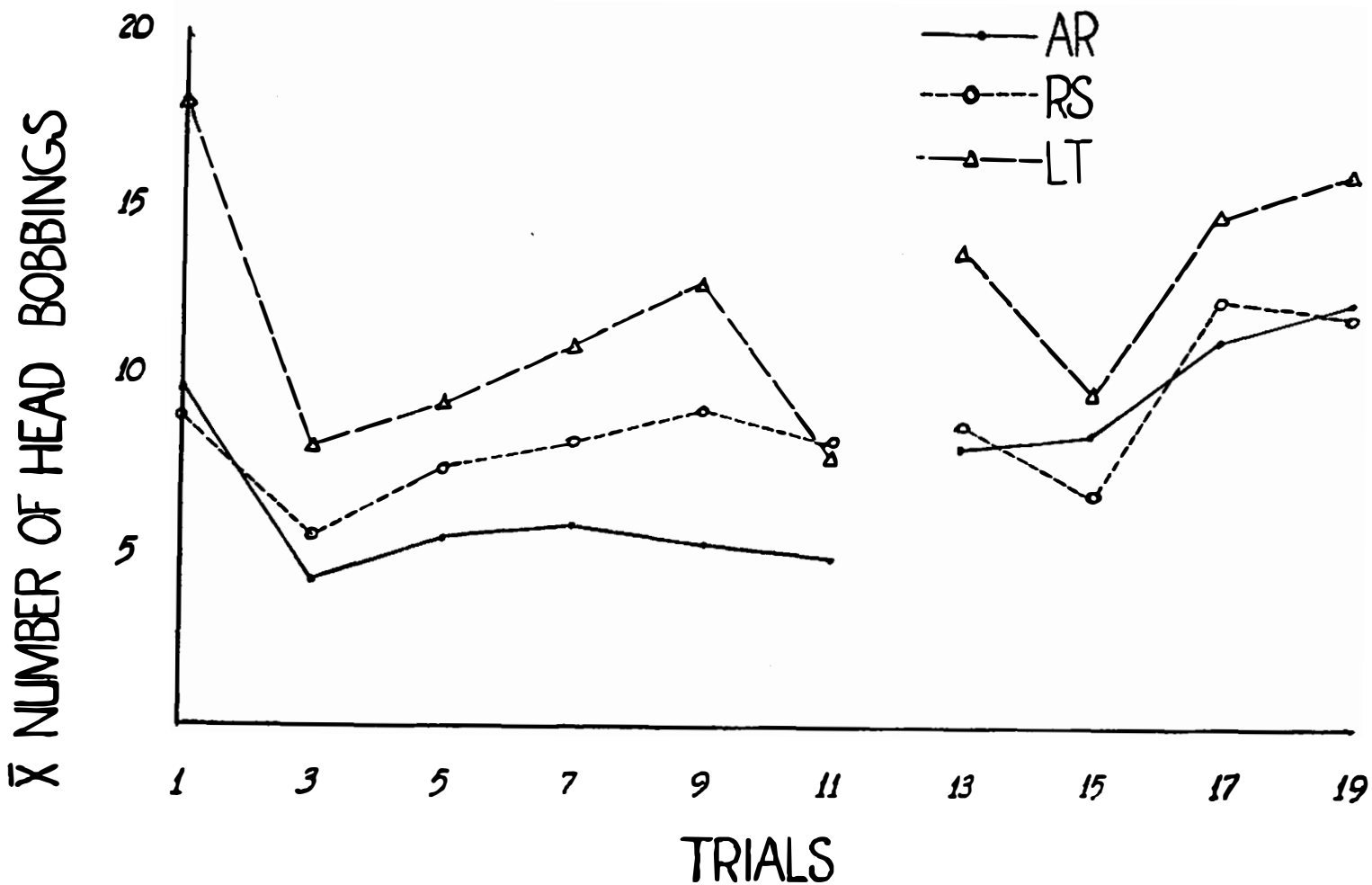

Figure 3. Mean number of head bobbings during open field trials for over-all treatment comparisons.

TABLE VII

SUMMARY OF ALEXANDER TREND TEST ON FREQUENCY OF HEAD BOBBING FOR OVER-ALL TREATMENT GROUPS

	Source of Variation	df	Mean Square	F	P
a.	Individual deviations from estimation (error)	816	19.2		
b.	Group deviations from estimation	34	33.2	1.21	.20
c.	Between-individual slopes	48	118.7	6.18	.001
d.	Between-group slopes	2	200.0	10.47	.001
e.	Between-individual means	48	139.9	7.28	.001
f.	Between-group means	2	1162.0	61.04	.001
g.	Over-all deviations from linearity	17	1.6		
h.	Over-all slopes	1	1765.9	92.49	.001

TABLE VIII

COMPARISON OF ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ON FREQUENCY OF HEAD BOBBING ACROSS ALL TRIALS OF OPEN FIELD BEHAVIOR

	Trials											
	1		2-6		7-11		12-16		17-19		Total	
Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
AR	8		19		26		30		33		112	
RS	8		29	.015	36	.125	41	.055	37		156	.045
AR	8		19		26		30		33		112	
LT	23		23		22		57		34		210	
RS	8		29		36		41		37		156	
LT	23	.016	23	.009	22		57	.05	34		210	.021

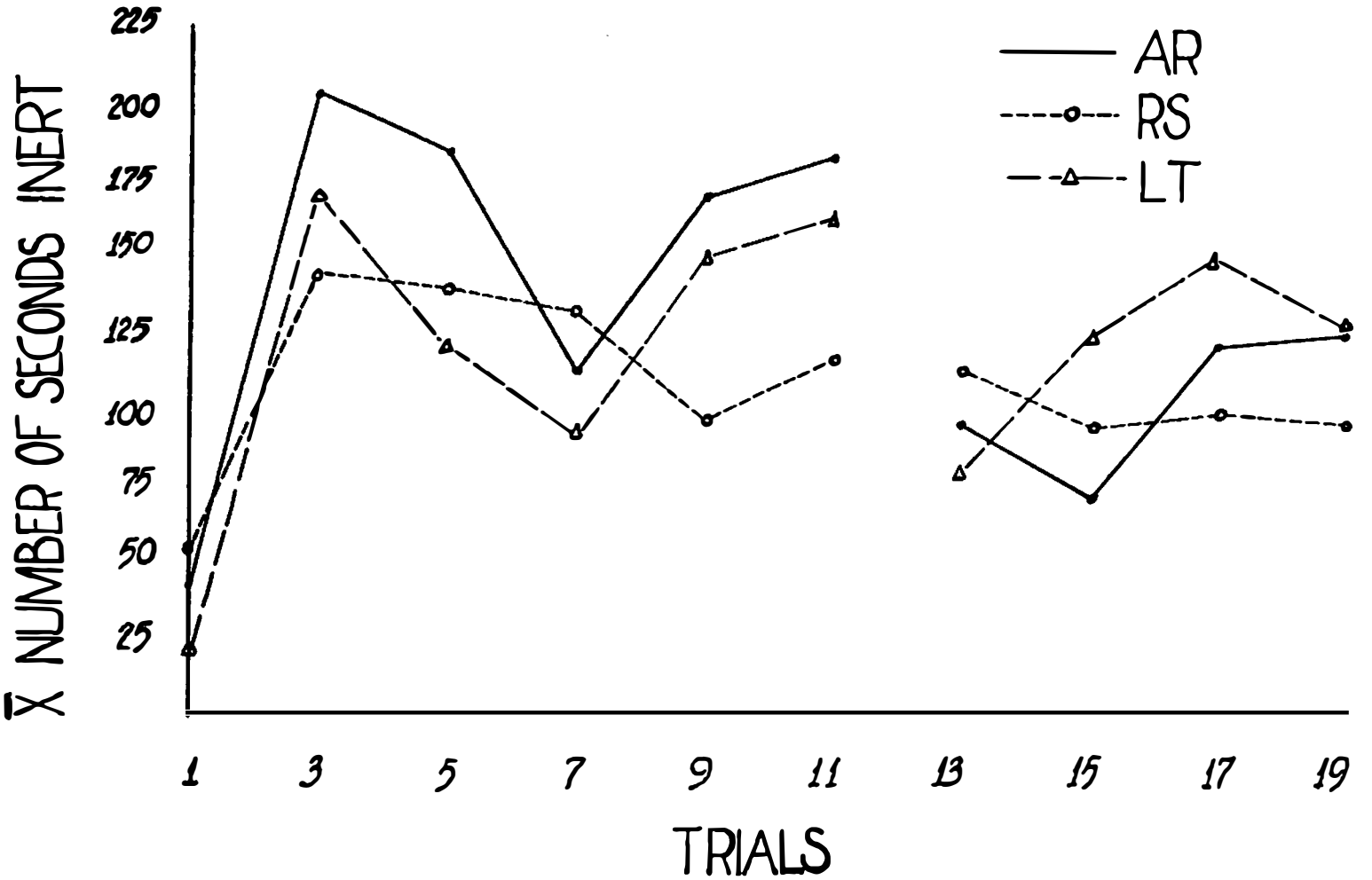

Figure 4. Mean number of seconds inert during open field trials for over-all treatment comparisons.

TABLE IX

SUMMARY OF ALEXANDER TREND TEST ON FREQUENCY OF INERTNESS FOR OVER-ALL TREATMENT GROUPS

Source of Variation	df	Mean Square	F	P
a. Individual deviations from estimation (error)	816	11019.4		
b. Group deviations from estimation	34	27283.0	2.48	.001
c. Between-individual slopes	48	18817.9	1.71	.025
d. Between-group slopes	2	37837.6	3.43	.05
e. Between-individual means	48	72585.2	6.58	.001
f. Between-group means	2	38190.0	3.46	.001
g. Over-all deviations from linearity	17	20077.0	1.82	.05
h. Over-all slope	1	2250.9		

substantially the same results as those for rearing and head bobbing.

The comparisons of trial blocks, Table X, resulted in few significant differences. On the first trial the AR groups showed less inertness than the RS groups ($p = .05$); but the trials crossed over for the 2-6 block ($p = .16$), and continued significant for trials preceding the break after trial 11 ($p = .15$). There were no significant differences between the AR and LT groups, and only one comparison between RS and LT was significant with RS more inert on trial one ($p = .12$).

Qualitative observations of Ss may clear up the above results. Inertness seemed to be of two types; that with the concurrent effects of rapid heart beat and breathing, muscle tenseness, and tremor; the other type was a more relaxed body position, slower breathing and apparent heart rate, and, at times, sleep.

LT and RS Ss behaved more in the first manner than AR Ss and this may be designated as freezing; the AR rats mostly behaved in the relaxed manner of inertness. The freezing behavior occurred in the early trials and on trials 12 and 13, which followed the break in trials.

One finding for I was clear cut; compared to gross movement responses it started low and increased until the break after trial 11, then it again dropped to a low level and began to increase through the remaining trials.

The RS Ss were significantly more inert on trial one than either LT or AR groups, and this inertness seemed to be of the freezing type. The lack of any difference between the LT and AR groups on trial one may be explained by the high GE responses for the LT groups; I and GE are not compatible responses. If the I of the RS groups is classified

TABLE X

COMPARISON OF ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ON SECONDS OF INERTNESS ACROSS ALL TRIALS OF OPEN FIELD BEHAVIOR

	Trials											
	1		2-6		7-11		12-16		17-19		Total	
Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
AR	0		920		840		360		310		2690	
RS	30	.05	810	.16	525	.15	380		390		1720	
AR	0[a]		920		840		360		310		2690	
LT	0		485		620		465		540		2360	
RS	30[a]		810		525		380		390		1720	
LT	0	.12	485		620		465		540		2360	

[a]Responses were set up on the basis of occurrence or non-occurrence, and then Fisher's exact test was applied to that distribution.

as freezing, then the high GE response for the LT groups may be described as a panic-like running. It was difficult on early trials for E to hold the LT Ss when placing them into the open field because of their gross bodily movements. At times they seemed to be running before they were actually in contact with the floor of the field.

The effects of reduced stimulation seemed to freeze RS Ss on early trials, but with the LT group little freezing took place until three. However, they exhibited higher GE.

Grooming. Although no significant differences are reported for grooming in the comparisons of Table IX, nine out of ten comparisons the LT group had an equal or higher median. The evidence of this behavior was low.

Defecation. Table XII shows significantly less defecation for AR groups than either RS or LT groups on trial blocks 1, 2-6, and total even though the absolute frequency was not much above zero. All groups have median values of no Ss defecating on the last three trials. The pre-experimental environments of the RS and LT groups raises their defecation level for early trials as compared to AR Ss. The median frequency over all trials was LT, RS, and AR, in descending order. The tendency was for LT Ss to respond initially at higher levels than the other two groups, but in later trials the RS group exceeded them. A similar trend may also be seen for variables GE and I in Figs. 1 and 4, respectively.

The indications are that the LT environmental effects on trial one were more severe than the reduced stimulation room effects, but, just for the previously mentioned sensitive variables, the effects tend

TABLE XI

COMPARISON OF ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ON FREQUENCY OF GROOMING ACROSS ALL TRIALS IN THE OPEN FIELD

	Trials											
	1		2-6		7-11		12-16		17-19		Total	
Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
AR	0		2		2		3		1		12	
RS	0		2		3		2		3		7	
AR	0		2		2		3		1		12	
LT	2		4		5		5		1		16	
RS	0		2		3		2		3		7	
LT	2		4		5		5		1		16	

TABLE XII

COMPARISON OF ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ON FREQUENCY OF DEFECATION ACROSS ALL TRIALS IN THE OPEN FIELD

	Trials[a]											
	1		2-6		7-11		12-16		17-19		Total	
Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
AR	0		0		0		0		0		1	
RS	0	.20	2	.01	1	.10	1		0		5	.06
AR	0		0		0		0		0		1	
LT	1	.04	2	.05	1		0		0		6	.08
RS	0		2		1		1		0		5	
LT	1		2		1	.20	0		0		6	

[a]All comparisons were set up on the basis of occurrence or non-occurrence, and then Fisher's exact test was applied to the resulting distributions.

to lessen more rapidly than for the RS groups on later trials, eg., block 17-19.

Subgroup Comparisons

Aside from comparing the effects of the major variables, it seemed worthwhile to examine what the contributions of each subgroup was.

AR vs RS subgroups. In the comparison of UT-AR-Col with UT-RS-Col, Table XIII, the RS group showed significantly more GE, HB, and D; they also did more rearing. There was a tendency for a reversed trend for I, and G was consistently less. The general picture was one of agreement with the overall group comparisons of AR with RS groups.

The comparison of the RB-AR-Col with RB-RS-Col, Table XIV, produced results similar to the UT group comparisons. The only difference seemed to have been in grooming and defecation. The RB-AR group groomed more than the RS group while the reverse was true for the UT Ss. Whether this was a genetic factor or a sampling phenomenon we do not know. This reversal may have obscured the overall group comparisons.

Table XV summarizes the comparisons for RB-AR-Iso with RB-RS-Iso. On the D, HB, and R dimensions the pattern was the same as the overall group analysis; but on GE and I the AR performance reversed from previous comparisons, although the differences were not significant.

The effects, for the most part, are not as clear cut as other comparisons presented so far. The RB Ss tended to be less affected by the experimental treatments. Whether this was sampling fluctuation or a genetic factor we do not know.

TABLE XIII

COMPARISON OF UT ANIMAL ROOM COLONY WITH UT REDUCED STIMULATION COLONY ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	AR-Col	76		99		157		296		163		901	
GE	RS-Col	72		368	.10	545	.05	364		317	.05	1672	.04
	AR-Col	16		22		39		54		34		173	
R	RS-Col	8	.10	50		76	.10	30	.15	42	.20	206	
	AR-Col	6		14		19		25		36		103	
HB	RS-Col	5		30	.01	40	.01	35	.15	37		146	.05
	AR-Col	0		1190		430		360		220		1820	
I	RS-Col	45		270	.10	90	.10	440		90	.15	920	.04
	AR-Col	0		3		3		7		4		16	
G	RS-Col	0		1		1		1	.04	1	.15	6	.05
	AR-Col	0		0		0		0		0		1	
D	RS-Col	1		2	.05	2	.15	2	.04	0		8	.02

TABLE XIV

COMPARISON OF RB ANIMAL ROOM COLONY WITH RB REDUCED STIMULATION COLONY ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	AR-Col	174		165		233		182		70		892	
GE	RS-Col	100		252		276		280	.10	148	.05	956	
	AR-Col	30		39		40		40		22		194	
R	RS-Col	17		36		61		64		34		220	
	AR-Col	16		40		40		38		20		170	
HB	RS-Col	10		44		53	.20	49	.20	36	.035	191	
	AR-Col	10		1055		952		1048		668		3540	
I	RS-Col	65		872		772		832	.15	522	.20	3208	.15
	AR-Col	2		2		2		1		0		5	
G	RS-Col	2		8	.20	7	.15	5	.007	8	.02	32	.02
	AR-Col	1		4		2		2		1		8	
D	RS-Col	1		4		1		1		0		6	

Comparisons of UT-AR-Iso with UT-RS-Iso, Table XVI, followed the trend for UT colony comparisons with a larger number of significant values. The total column results show more frequent responding for RS Ss on variables GE, R, HB, and D; less for G and I. On trial one the RS Ss showed more frequency of GE, R, and HB; I was a reversal and no differences appear for D and G.

Overall the picture was again one of the reduced stimulation pre-experimental environment elevating the gross movement responses of GE, R, and HB for the first and total trials; I and G were depressed for total trials and D was higher.

LT vs RB groups. Comparisons of LT-Col with RB-AR-Col, Table XVII, showed little significant differences for overall responding. Similarily, the comparison of LT-Col with RB-RS-Col, Table XVIII, resulted in few significant values. The effects of pre-experimental environments were not clear cut for LT-RB subgroup comparisons of colony Ss on first and total trials.

Results for all trials in Table XIX, LT-Iso compared with RB-AR-Iso, showed the LT group had greater frequency of GE ($p = .05$), R ($p = .15$), G and D. The AR group was more inert ($p = .20$) and did slightly more HB. The more sensitive measures GE, R, D, and I indicate that the pre-experimental effects, as shown in these comparisons, were in line with the overall comparisons for major groupings. Reversals of G and HB may indicate the general lack of sensitivity of these measures or may have been the extraneous variable factors first discussed above.

First trial comparisons found the LT group making more GE ($p = .05$). No other variables were significant but were in the direction of overall

TABLE XV

COMPARISON OF RB ANIMAL ROOM ISOLATES WITH RB REDUCED STIMULATION ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	AR-Iso	128		138		136		405		152		998	
GE	RS-Iso	109		67		122		243		120		666	
	AR-Iso	21		30		32		82		52		331	
R	RS-Iso	26		17		15		26		19		76	
	AR-Iso	16		31		42		62		52		218	
HB	RS-Iso	13		26		30		56		36		189	
	AR-Iso	0		1102		1015		458		292		2870	
I	RS-Iso	20		1260		1080		880		615		3545	
	AR-Iso	0		3		1		2		1		8	
G	RS-Iso	0		2		2		2		0		6	
	AR-Iso	0		4		1		0		0		5	
D	RS-Iso	1		4		2		1		0		7	

TABLE XVI

COMPARISON OF UT ANIMAL ROOM ISOLATES WITH UT REDUCED STIMULATION ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	AR-Iso	82		148		124		396		320		1042	
GE	RS-Iso	90		230		227	.15	408		399		1418	
	AR-Iso	14		26		14		60		48		160	
R	RS-Iso	16		21		32	.10	48		62		188	
	AR-Iso	4		14		15		23		29		92	
HB	RS-Iso	10	.15	28	.035	26	.02	40	.01	38	.20	144	.01
	AR-Iso	40		750		740		120		85		1805	
I	RS-Iso	10		250	.20	410		155		30		920	.15
	AR-Iso	0		2		2		9		3		18	
G	RS-Iso	0		0	.15	1		0	.035	3		6	
	AR-Iso	0		0		0		0		0		0	
D	RS-Iso	0		1		0		1	.14	0		1	.05

TABLE XVII

COMPARISON OF LATE TREATMENT COLONY WITH RB ANIMAL ROOM COLONY ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	LT-Col	100		178		156		372		87		786	
GE	AR-Col	174	.20	165		233		182	.20	70		892	
	LT-Col	21		23		58		76		23		192	
R	AR-Col	30		39		40		40		22		194	
	LT-Col	19		41		34		57		24		193	
HB	AR-Col	16		40		40		38		20		170	
	LT-Col	40		1140		1060		570		645		3745	
I	AR-Col	10		1055		952		1048	.20	668		3540	.20
	LT-Col	2		2		5		5		1		16	
G	AR-Col	2		2		2		1	.10	0	.10	5	
	LT-Col	1		2		0		0		0		3	
D	AR-Col	1		4		2		2		1		8	

TABLE XVIII

COMPARISON OF LATE TREATMENT COLONY WITH RB REDUCED STIMULATION COLONY ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	LT-Col	100		178		156		372		87		786	
GE	RS-Col	100		252		276		280		148		956	
	LT-Col	21		23		58		76		23		192	
R	RS-Col	17		36		61		64		34		220	
	LT-Col	19		41		34		57		24		193	
HB	RS-Col	10	.075	44		53	.025	49		36		191	
	LT-Col	40		1140		1060		570		645		3745	
I	RS-Col	65		872		772		832		522		3208	
	LT-Col	2		2		5		5		1		16	
G	RS-Col	2		8	.035	7		5		8		32	
	LT-Col	1		2		0		0		0		3	
D	RS-Col	1		4		1		1		0		6	

results.

Comparison of LT-Iso with RB-RS-Iso, Table XX, were in the direction of overall major comparisons on sensitive variables. Late treatment Ss had more GE ($p = .10$), R ($p = .10$), and less I ($p = .10$). There were no differences in D, and the LT group did more grooming and head bobbing.

On first trial results the same relative positions were found with the exception of G which was equal. The results for block 12-16 show the same positions and significance results as for total trials.

The pre-experimental effects were indicated by the clear cut results for LT-Iso vs RB-Iso in line with the analysis for major groups on the more sensitive variables of GE, R, and I. Although the findings for colony group comparisons were not as much in line with major comparisons it was felt that the RB-Col groups reflected some interaction with extraneous variables, and the reversals found were not of significance on overall comparisons.

Col vs Iso groups. Results for comparisons between colony and isolate groups for all UT, RB, and LT groups under the same major pre-experimental environments may be found in Appendix B, Tables CLX through CLXIV. Few of the comparisons were significant, and those that were occurred mostly for the UT and RB RS groups on the three major trial blocks; 1, 12-16, and total.

The dimension of colony cage environment compared with isolate cage environment did not appear as influential a variable on open field behavior as the major dimensions of reduced stimulation and late treatment.

TABLE XIX

COMPARISON OF LATE TREATMENT ISOLATES WITH RB ANIMAL ROOM ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	AR-Iso	128		138		136		405		152		998	
GE	LT-Iso	164		502	.05	448	.10	622	.15	179		1796	.05
	AR-Iso	21		30		32		82		52		331	
R	LT-Iso	32	.05	68	.15	90	.20	132		27		339	.15
	AR-Iso	16		31		42		62		52		218	
HB	LT-Iso	24		56		52		61		44		216	
	AR-Iso	0		1102		1015		458		292		2870	
I	LT-Iso	0		305	.15	620	.15	252		505		1760	.20
	AR-Iso	0		3		1		2		1		8	
G	LT-Iso	0		6		4		2		1		15	
	AR-Iso	0		4		1		0		0		5	
D	LT-Iso	1		2		1		1		1		7	

TABLE XX

COMPARISON OF LATE TREATMENT ISOLATES WITH RB REDUCED STIMULATION ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	LT-Iso	164		502		448		622		179		1796	
GE	RS-Iso	109	.10	67	.10	122	.20	243	.10	120		666	.10
	LT-Iso	32		68		90		132		27		339	
R	RS-Iso	26		17	.20	15	.20	26	.10	19	.10	76	.10
	LT-Iso	24		56		52		61		44		216	
HB	RS-Iso	13		26	.20	30	.20	56		36		189	
	LT-Iso	0		305		620		252		505		1760	
I	RS-Iso	20	.10	1260	.10	1080		880	.10	615		3545	.10
	LT-Iso	0		6		4		2		1		15	
G	RS-Iso	0		2	.15	2		2		0		6	
	LT-Iso	1		2		1		1		1		7	
D	RS-Iso	1		4		2		1		0		7	

However, the indications were that rats from isolate cages showed more tendency toward locomotor type behavior than colony reared rats. Further, the LT groups tended on early trials to show the above tendencies significantly ($p = .10$) For RS groups the GE variable was less sensitive than R and seemed to have been lowered by the longer inertness of the isolates ($p = .04$).

Elevated Maze

Trial by trial data for each S may be found in Appendix A, Table LXXXIV through Table CLV.

Three of the original variables were discarded; not eating, rearing, and number of periods of inertness; the latter because of inadequate recording by E, rearing and not eating for low incidence. The WMW test, Fisher's Exact Test, or the grand median test with FET were used for comparisons. Significance levels of $p = .20$ or less were used for interpretations. The use of the criterion of 100 minutes of maze time or 20 trials prevented the comparisons of some groups on the last four trials and some variables on any trials, mainly choice point and retrace errors in the latter case.

In those cases where Ss has been on the maze 100 minutes before the 17th trial it was not possible to make comparisons for the last four trials. Some variables interacted with inertness to prevent comparison over total trials. Choice point errors (CPE), retrace errors (RE), and stability (S) were not used for comparison when inertness lowered the response level; in the above cases the time spent in inertness prevented

the occurrence of the response.

Overall Group Comparisons

Maze controls vs AR, RS, and LT. In Tables XXI, XXII, and XXIII are summarized the results of the comparison of MC groups with AR, RS, and LT groups, respectively. There were very significant differences for the superior performance of AR and RS groups on time spent in the first section of the maze (TFS), total maze time (TT), and number of errorless trials (ET). The MC groups defecated more than either AR or RS ($p = .0001$). The indications were that for both AR and RS groups the open field experiences and handling generalized to facilitate learning on the elevated maze.

The AR and RS groups differed in comparisons with MC groups on HB and G, the least sensitive variables in the overall open field measurements. Although both field groups showed less grooming than MC groups, only the AR comparison was significant ($p = .0001$). The results for HB were reversed with AR groups showing less ($p = .0006$); but the control RS group comparison was not significant.

The comparison of LT groups with MC groups showed no significant differences for any variables over all trials. On the first four trials the LT group spent less time in the first section, spent less time on the maze ($p = .02$), did less grooming and defecating, and more head bobbing. The LT groups had had nineteen free field trials previous to elevated maze testing, yet they performed slightly and not significantly better than MC groups who had had no exploratory experience outside of home

TABLE XXI

COMPARISON OF MAZE CONTROL SS WITH ANIMAL ROOM SS ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS OF ELEVATED MAZE

Variables[a]	Group	Trials 1-4 Mdn	P	Trials 17-20 Mdn	P	Trials Total Mdn	P
Time first section	AR	2:58.0				5:39.5	
	C	36:23.4	.0003			68:22.7	.0001
Total maze time	AR	14:19.2				25:22.8	
	C	69:21.7	.0002			100:00.0	.0001
Errorless trials	AR					11	
	C					0	.0002
Head bobbing	AR	15				28	
	C	23.5	.0006			49	.0003
Grooming	AR	0				0	
	C	2	.0001			5	.0001
Defecation	AR	0				0	
	C	2	.0001			4	.0001

[a]Variables of choice point errors, retrace errors, and stability were not included due to inertness of Ss.

TABLE XXII

COMPARISON OF MAZE CONTROL SS WITH REDUCED STIMULATION SS ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS OF ELEVATED MAZE

Variables[a]	Group	Trials 1-4 Mdn	P	Trials 17-20 Mdn	P	Trials Total Mdn	P
Time first section	RS	4:03.1				31:24.6	
	C	36:23.4	.008			68:22.7	.05
Total maze time	RS	45:27.8				70:32.8	
	C	69:21.7	.0002			100:00.0	.0002
Errorless trials	RS					6	
	C					0	.0002
Head bobbing	RS	23				58	
	C	23.5				49	
Grooming	RS	1				3	
	C	2				5	
Defecation	RS	0				1	
	C	2	.0001			4	.0001

[a]Variables of choice point errors, retrace errors, and stability were not included due to inertness of Ss.

TABLE XXIII

COMPARISON OF MAZE CONTROL SS WITH LATE TREATMENT SS ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS OF ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	LT	9:00.6				69:27.5	
	C	36:23.4				68:27.7	
Total maze time	LT	19:52.1				100:00.0	
	C	69:21.7	.02			100:00.0	
Errorless trials	LT					1	
	C					0	
Head bobbing	LT	28				42	
	C	23.5				49	
Grooming	LT	0				1	
	C	2				5	
Defecation	LT	0				1	
	C	2				4	

cages previous to maze trials.

The findings in brief were that there was most facilitation of maze learning for AR groups, less for RS groups, and, comparatively none for LT groups when compared to the MC groups.

Subgroup Comparisons

AR vs RS. Comparison of AR groups with RS groups is presented in Table XXIV. The AR groups showed very significant superiority on overall trials for the learning measures; TT ($p = .01$), and ET ($p = .016$). The RS groups did significantly more HB ($p = .01$), G ($p = .075$), D ($p = .002$), and were less stable ($p = .0005$).

On the first four trials the RS groups took more time to leave the first section, TT, made more CPE and RE, did more HB, G, and were less stable. Time to leave the first section, HB, G, and S were significant. There was no difference in D.

Comparisons across the last four trials were very significant on the three variables compared, TFS, TT, and ET; and in the same direction as total trial comparisons.

The results indicate very significant differences in learning times and scores as a function of the interaction of pre-experimental environments and generalization of open field learning; AR groups learn more in less time. They showed less HB, G, and D. The very significant differences in stability indicate that the reduced stimulation environment affects in some way the ability of the Ss to maintain balance on the narrow runway.

TABLE XXIV

COMPARISON OF ANIMAL ROOM SS WITH REDUCED STIMULATION SS ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	AR	2:58.0		29.4		5:39.5	
	RS	4:03.1	.125	5:44.2	.0001	31:24.6	.147
Total maze time	AR	14:19.2		1:29.4		25:22.8	
	RS	45:27.8		6:37.8	.0008	70:32.8	.01
Errorless trials	AR	0		4		11	
	RS	0		3	.001	6	.016
Choice point errors	AR	7					
	RS	9					
Retrace errors	AR	5					
	RS	6					
Head bobbing	AR	15				28	
	RS	23	.162			58	.01
Grooming	AR	0				0	
	RS	1	.05			3	.075
Defecation	AR	0				0	
	RS	0				1	.0002
Stability	AR	2				7	
	RS	10	.001			13	.0005

A comparison with the MC groups indicated there was generalization from field trials to elevated maze performance for both groups but significantly less for RS than AR groups.

LT vs RB AR and RS. Comparisons of LT groups with RB-AR and RS groups are presented in Tables XXV and XXVI. Although there was a tendency for the LT groups to be inferior on time scores, the differences were not significant. The error scores showed the AR groups to be superior to the LT groups, and the reverse was true for the RS-LT comparisons.

UT AR and RS subgroups. Differences between UT-AR and UT-RS groups are compared in Table XXVII. On measurements for all trials the groups were significantly different on every variable. The AR group took less TT ($p = .05$), less TFS ($p = .007$), fewer CPE ($p = .11$) and RE ($p = .09$), less HB ($p = .008$), less G ($p = .021$), fewer Ss defecated ($p = .005$), and more made errorless runs ($p = .008$). The AR group was very significantly more stable ($p = .0001$).

None of the comparisons on the first four trials were significant, but were in the same direction as total trials except for the reversal on TT. On the last four trials the variables TFS, TT, ET, and HB were very significant and in the same direction as total trials; no differences were found for other variables.

The results clearly demonstrate the superiority of the UT-AR groups over UT-RS groups for elevated maze learning.

RB AR and RS subgroups. Comparisons for RB-AR with RB-RS groups are presented in Table XXVIII. Results for all trials were, for the most part, in the direction of the UT AR and RS comparisons reviewed

TABLE XXV

COMPARISON OF LATE TREATMENT GROUPS WITH RB ANIMAL ROOM GROUPS ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

Variables[a]	Group	Trials 1-4 Mdn	Trials 1-4 P	Trials 17-20 Mdn	Trials 17-20 P	Total Mdn	Total P
Time first section	AR	6:00.4				12:28.2	
	LT	9:00.6				69:27.5	.15
Total maze time	AR	16:04.9				34:35.1	
	LT	19:52.1				100:00.0	
Errorless trials	AR					9	
	LT					1	
Head bobbing	AR	22.5				59	
	LT	28				42	.20
Grooming	AR	1				2.5	
	LT	0				1	
Defecation	AR	0				0	
	LT	0	.15			1	.20

[a]Variables of choice point errors, retrace errors, and stability were not included due to inertness of Ss.

TABLE XXVI

COMPARISON OF LATE TREATMENT GROUPS WITH RB REDUCED STIMULATION GROUPS ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables[a]	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	RS	12:59.0				48:15.0	
	LT	9:00.6				69:27.5	.148
Total maze time	RS	21:49.5				90:35.5	
	LT	19:52.1				100:00.0	
Errorless trials	RS					1	
	LT					5	.10
Head bobbing	RS	26				59	
	LT	28				42	
Grooming	RS	3				6	
	LT	0	.10			1	
Defecation	RS	0				1	
	LT	0				1	

[a]Variables of choice point errors, retrace errors, and stability were not included due to inertness of Ss.

TABLE XXVII

COMPARISON OF UT ANIMAL ROOM SS WITH UT REDUCED STIMULATION SS ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS OF ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	AR	2:12.6		:22.6		4:50.4	
	RS	2:60.0		3:21.5	.0005	18:39.4	.007
Total maze time	AR	13:16.8		1:16.9		20:43.0	
	RS	12:39.2		4:05.4	.002	38:25.3	.05
Errorless trials	AR			4		11	
	RS			3	.0002	8	.008
Choice point errors	AR	8		0		10	
	RS	11		0		20	.11
Retrace errors	AR	7		0		10	
	RS	8		0		16	.09
Head bobbing	AR	9		2		25	
	RS	9.5		8.5	.0001	52.5	.008
Grooming	AR	0		0		0	
	RS	0		0		2	.021
Defecation	AR	0		0		0	
	RS	0		0		0	.005
Stability	AR	2		0		6	
	RS	10	.01	0		16.5	.0001

TABLE XXVIII

COMPARISON OF RB ANIMAL ROOM SS WITH RB REDUCED STIMULATION SS ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS OF ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	AR	6:00.0				12:28.2	
	RS	12:59.0				48:15.0	.20
Total maze time	AR	16:04.9				34:35.1	
	RS	21:49.5				90:35.5	.10
Errorless trials	AR					9	
	RS					5	
Choice point errors	AR	4					
	RS	7	.15				
Retrace errors	AR	4.5					
	RS	5					
Head bobbing	AR	22.5				59	
	RS	26				59	
Grooming	AR	1				2.5	
	RS	3				6	.04
Defecation	AR	0				0	
	RS	0				1	.085
Stability	AR	7.5				8	
	RS	10	.07			11	.20

earlier but not as significant. Animal room groups spent less TFS ($p = .20$), less TT ($p = .10$), less G ($p = .04$); and made more ET, and were more stable ($p = .20$). No differences were found for HB and more RS Ss defecated than AR ($p = .085$).

For the first four trials only CPE ($p = .15$) and S ($p = .07$) were significant; however, all measures were in the same direction as for total trials.

Again the superiority of AR groups to RS groups was found for TT, ET, D, and S. The absence of as clear cut or significant findings for RB groups as that found for UT group differences may have been the interaction of the extraneous variables likely present as was discussed for results of open field trials.

UT-AR-Col vs UT-RS-Col. Comparisons of UT-AR-Col with UT-RS-Col are presented in Table XXIX. The direction of previously reported AR-RS differences was supported by the results for total trials and the 17-20 block. Although not significant on the first four trials the AR groups tended to spend more time in the first section and make more retrace errors; all other comparisons for the early trials were in the direction of total results. Stability was very significant for total trials ($p = .02$) and block 1-4 ($p = .01$). Head bobbing was very significant across the board; p values were .035, .02, and .01 respectively. On trials 17-20 and total the AR groups spent less TFS (Ps of .01 and .02); and on trials 17-20 less TT ($p = .02$).

Relative to the overall AR-RS comparisons the UT-Col results were not as significant but in the same direction.

TABLE XXIX

COMPARISON OF UT ANIMAL ROOM COLONY WITH UT REDUCED STIMULATION COLONY ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS OF ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	AR-Col	3:26.7		:20.4		4:50.7	
	RS-Col	3:20.0		3:25.0	.01	14:37.1	.02
Total maze time	AR-Col	8:03.4		1:15.2		17:52.3	
	RS-Col	10:02.1		4:05.4	.02	25:18.1	
Errorless trials	AR-Col			4		11	
	RS-Col			3.5		10	
Choice point errors	AR-Col	8		0		10	
	RS-Col	12		0		19	
Retrace errors	AR-Col	7		0		10	
	RS-Col	6.5		0		10	
Head bobbing	AR-Col	14		2		25	
	RS-Col	24.5	.035	8.5	.02	69.5	.01
Grooming	AR-Col	0		0		0	
	RS-Col	1.5	.17	0		2.5	
Defecation	AR-Col	0		0		0	
	RS-Col	0		0		0	
Stability	AR-Col	0		0		6	
	RS-Col	9.5	.01	1		15	.02

RS-AR-Col vs RB-RS-Col. Comparisons of RB-AR-Col with RB-RS-Col are presented in Table XXX. Animal room groups had less TFS ($p=.025$), less TT ($p=.05$), less G ($p=.10$), more ET ($p=.10$), and more S ($p=.20$). Frequency of HB was reversed relative to previous AR-RS maze comparison.

For the most part, median comparisons were in the same direction as total trials for the first four trials; only TT was significant ($p=.15$).

As in previous comparisons the superiority of the AR group was found; and, again, the action of extraneous variables for RB groups may have affected the significance levels which were not as high as those for UT groups.

UT-AR-Iso vs UT-RS-Iso. Results for the comparisons of UT-AR-Iso with UT-RS-Iso are given in Table XXXI. On totals for all trials the AR groups took less TFS ($p=.02$), did less HB ($p=.15$), and fewer Ss defecated ($p=.01$); they were more stable ($p=.175$). Not significant but in the direction of previous AR-RS comparisons were TT, ET, RE, and G. The AR group made more CPE. Again results for the first four trials and the last four trials were in the same direction, for the most part, as total trials results. On the last four trials the AR group made significantly more ET ($p=.05$).

The results do not show the superiority of AR Ss as clearly as previous comparisons, but they do emphasize the smaller generalization decrement in the stimulus change of the elevated maze for the AR groups.

RB-AR-Iso vs RB-RS-Iso. Table XXXII gives the comparisons of RB-AR-Iso with RB-RS-Iso. None of the differences were significant. The comparisons do suggest that the RB-Iso groups were less predictable

TABLE XXX

COMPARISON OF RB ANIMAL ROOM COLONY WITH RB REDUCED STIMULATION COLONY ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	AR-Col	6:01.3				10:36.4	
	RS-Col	29:51.6				61:29.8	.025
Total maze time	AR-Col	16:29.5				34:35.0	
	RS-Col	38:40.4				93:49.3	.05
Errorless trials	AR-Col					10	
	RS-Col					4.5	.10
Choice point errors	AR-Col	4					
	RS-Col	6.5					
Retrace errors	AR-Col	5					
	RS-Col	3.5					
Head bobbing	AR-Col	29				74	.10
	RS-Col	24				54	.10
Grooming	AR-Col	1				2	
	RS-Col	3.5				8	.10
Defecation	AR-Col	0				0	
	RS-Col	.5				1	.20
Stability	AR-Col	1				9.5	
	RS-Col	9				5.5	.20

TABLE XXXI

COMPARISON OF UT ANIMAL ROOM ISOLATES WITH UT REDUCED STIMULATION ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS OF ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	AR-Iso	:55.8		:23.7		3:56.6	
	RS-Iso	4:25.5	.02	2:32.3	.20	27:44.1	.02
Total maze time	AR-Iso	14:10.0		1:10.0		22:41.2	
	RS-Iso	12:58.1		3:50.2	.20	63:50.8	
Errorless trials	AR-Iso			4		11.5	
	RS-Iso			3	.05	8	
Choice point errors	AR-Iso	10		0		20	
	RS-Iso	9		0		14	
Retrace errors	AR-Iso	9.5		0		12	
	RS-Iso	7		0		19.5	
Head bobbing	AR-Iso	.5		2		22	
	RS-Iso	7	.015	6.5	.10	48	.15
Grooming	AR-Iso	0		0		0	
	RS-Iso	0		0		2	
Defecation	AR-Iso	0		0		0	
	RS-Iso	1		1		1	.01
Stability	AR-Iso	9		0		13	
	RS-Iso	15	.15	0		20	.175

TABLE XXXII

COMPARISON OF RB ANIMAL ROOM ISOLATES WITH RB REDUCED STIMULATION ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	AR-Iso	11:04.3				43:54.8	
	RS-Iso	4:03.1				29:38.2	
Total maze time	AR-Iso	30:10.0				81:47.2	
	RS-Iso	12:07.1				79:35.5	
Errorless trials	AR-Iso					4.5	
	RS-Iso					10	
Head bobbing	AR-Iso	20.5				40	
	RS-Iso	31	.20			75	
Grooming	AR-Iso	1.5				3	
	RS-Iso	0				4	
Defecation	AR-Iso	0				0	
	RS-Iso	0				1	

than other groups.

Col vs Iso groups. Results for comparisons between colony and isolate groups for all UT, RB, LT, and MC groups under the same overall pre-experimental conditions may be found in Appendix B, Tables CLXV through CLXX.

For the most part, the findings show very few significant values. The directional results for comparisons of medians were not clear cut, but there was some tendency for colony groups to take less TT, less CPE, less RE, and fewer Ss defecated; they tended to make more G and HB responses. On number of errorless trials no difference was found between the groups.

As was true for open field comparisons, the dimension of colony cage environment compared with isolate cage environment does not appear as influential a variable in elevated maze learning as the major dimensions of reduced stimulation and late treatment. However, the indications were that rats raised in colony cages will show slight superiority on the learning dimension by having lower time scores. Colony animals were more stable on the maze runway, particularly in the early trials, indicating that some learning comparable to stability took place in the colony cages that did not take place in isolate cages.

Weights

Weights at the end of experimentation for each S may be found in Tables CLVI through CLIX of Appendix A.

Means and standard deviations for groups AR, RS, LT, and MC are

given in Table XXXIII. Hartley's test showed that the variances were homogenous.

Summary of an analysis of variance for the data is given in Table XXXIV. The F of 7.31 is significant, p=.01.

The distribution of means was, in order of rank from heaviest weight to lightest, MC, RS, LT, and AR. The positions of the MC groups and AR groups indicate that the free field experience had the effect of reducing weight; for, other than the field schedule, the two groups had similar environments. Such weight loss could be explained by two variables or the interaction of both; the open field trials provided sufficient motor activity and/or the excitement level initiated by the open field trials lowered the weights.

The finding that animals with restricted environments had heavier gross body weights than those from non-restricted environments is contrary to results from other studies reported in Chapter I. The findings of this study permit the inference that the enforced lessened activity of the reduced stimulation environment, through less external stimulation for activity, resulted in less utilization of caloric intake with consequent heavier weight. A further explanation may be in the different eating habits observed for Ss in the reduced stimulation room and animal room. It was noticed, during the ad libitum feeding period, that the animal room Ss were still eating after cage noises associated with eating were no longer coming from reduced stimulation room cages. It was decided to check each RS and LT cage at a time five minutes after the last RS or LT S had been fed. The observations showed that the reduced stimulation

TABLE XXXIII

MEAN WEIGHTS AT END OF EXPERIMENTATION
FOR ALL GROUPS

Group	N	Mean	SD
MC	16	275.44	42.61
RS	23	238.61	31.96
LT	7	238.29	32.74
AR	21	226.66	36.44

TABLE XXXIV

SUMMARY OF ANALYSIS OF VARIANCE OF WEIGHTS AT END OF EXPERIMENTATION FOR ALL GROUPS

Source of Variation	Sum of Squares	df	Mean Square	F	P
Total SS	127491	66			
Between	32931	3	10977	7.31	.01
Within	94560	63	1501		

room Ss tended to eat their food more rapidly than AR Ss. Further, E's notes indicate a greater frequency of water bottle refilling for the Ss in the reduced stimulation room. Unfortunately no records were kept of the amount of food eaten by each S during the period prior to the 10 gm per day diet so that the higher weight level for RS and LT Ss as compared to AR Ss could have been a function of more food intake. However, the absence of a reduced level of external stimulation for RS and LT Ss would lower the sensitivity of these Ss for external stimulation resulting in an increase in activity in the presence of food pellets (8) from which increased eating and consequent increased weight could be predicted.

The findings of Ruegamer, et al. (39) differ from this experiment but the pre-experimental cage conditions also differed. In their study the cages were of mesh bottom and sides with reduction of visual or other cues except for handling. The above conditions also holds for Bernstein's (5) report. Although the Weininger (44) study does not spell out the cage conditions, the housing of his Ss was in individual cages and the only pre-experimental variation reported was that of handling. Thompson & Heron (42) report higher mean weights for normals over restricted environment Ss, but the age at which the reported weights were taken was not given. In the latter experiment the Ss were kept in varying stages of restriction and termination of restriction varied; in addition, age at time of testing period.

The inference that the absence of external stimulation contributed to the heavier weight of Ss with open field experience and reduced stimulation room experience would be supported if the group with both AR and

RS experience were between the RS Ss and AR Ss in rank order of mean weights and this actually was the case for the LT groups.

Qualitative Observation

One finding that was not subject to statistical measurement was the high excitability level of the RS and LT isolate Ss when being removed from their home cages for early open field trials. These Ss seemed to respond with either biting or cringing on the floor of the cage. Animal room Iso Ss attempted to avoid E but only one S attempted to bite E and none cringed on the floor of the cage.

On the elevated maze the reduced stimulation room Ss, both RS and LT groups, who reached the food cup at the goal point tended to take a bite of the wet mash and back up on the runway a short distance before eating; however, the AR Ss tended to take the wet mash and eat without leaving the food cup.

CHAPTER IV

DISCUSSION

The results of this study clearly support the hypothesis of increased locomotion in the open field and for the depressant effects of restricted pre-experimental environments upon learning of the elevated maze pattern employed. This hypothesis was based on the assumption that the animal with broader pre-experimental contact with external environmental changes would show less generalization decrement in the stimulus change situation of the experimental testing. Further, it was assumed that the broader history of stimulus-response associations would provide animal room Ss with a broader response repertoire for adjustment to the introduction of the Ss into the open field or on the elevated maze.

On many dimensions the testing situations were less strange to the AR Ss; the animal room environment was illuminated the same as both testing rooms; the animal room environment noise level was higher; humans were frequently in the animal room; other rats were present and visible; cages were moved weekly to different positions; and there were many adventitous stimuli not recorded by E. These conditions contributed to the stimulus environment of the animal room groups, and either they were not present or were present to a lesser degree in the reduced stimulation room. It was concluded that there was less stimulus change in the testing situation and transportation to it for animal room Ss than for Ss from the reduced stimulation room.

Elevated Maze Learning

Although the elevated maze trials followed the start of open field measurements by 33 days, the hypothesis of greater learning for AR groups, less for RS, and least for LT was significantly upheld. The findings that the groups should be significantly more apart on the elevated maze task than in open field behavior was foreshadowed by several studies. Thompson & Heron (40) suggested that one variable influencing the testing for effect of restriction was the time at which testing took place; they felt that oftimes small or no differences were found because the effects were sought too soon after the restriction ended. The present study indicates that the longer period of time from initial restriction til testing on the elevated maze as compared to the interval for open field measurements may have been a factor in these results.

Christie (10) has shown that the animal with increased opportunities for exploration previous to elevated maze testing was a better learner; certainly the superiority of the AR and RS groups to the MC groups in the present study indicates that opportunity for exploration in the open field previous to the elevated maze experience facilitates learning of the maze pattern. One point is apparent, the findings of superiority of the enriched environment groups as compared to the reduced stimulation groups is in agreement with the literature on restriction of the environment and its effect on learning (2, 6, 15, 25).

An additional consideration in explaining the differences between the AR groups and the RS groups is Hebb's (24) concept of the importance

of early learning upon adult behavior. This view holds that the absence of sensory or motor experiences in the infancy of restricted groups will result in poorer learning than would be the case for non-restricted groups. It was held that learning early in life is made up for the most part of the establishment of neurological phase sequences that are fundamental in the learning to take place later in life. Again, the findings of this study support such a position.

One point of view that could also explain the differences between the AR and RS groups on the elevated maze performance could be that the Ss from enriched environments, AR Ss, having had the greater opportunity for experiences with stimulus change per se, would, therefore, show more efficient responses to the stimulus changes present in the testing situations. Specifically this is the case of an organism learning to respond adaptively to change as a function of experience with previous changes in its environment. There would be less generalization decrement in behavior for an organism that has in the past had exposure to more stimulus change as compared to an organism with less experience.

No study with similar pre-experimental treatment has been reported which could be compared with the findings of the LT groups of this experiment. Bernstein (5) found that when the handling schedule of extra handled or non-handled Ss was changed during extinction the changed environment Ss made more errors than either extra handled or non-handled groups whose schedule went unchanged. In viewing extinction as new learning the above study would support the position that changes in well

established habit patterns in the adult or near adult rat can negatively influence learning. In the study reported here it was found that age of introduction to the reduced stimulation environment was inversely related to the amount of elevated maze learning.

The findings that the LT groups tended not to learn as well as RS group qualifies somewhat the position of the importance of early learning as held by Hebb and his colleagues (24). However, it should be pointed out that the LT group, compared to the AR and RS Red Bank animals differed primarily in terms of error scores. Thompson & Heron (39) stated that ". . .it seems likely that the early part of an individual's life is of great importance in determining his psychological make-up, and in fact, is more important than later life. . ." (p. 82). The performance of the LT groups suggests that this likelihood may be modified by the nature of the stimulus change and its time of occurrence in the life of the organism.

The moving of the LT groups from the animal room environment to the reduced stimulation room may have interacted with the early animal room experiences of the LT Ss in such a way as to reduce learning for the LT groups below that of the RS groups. The learned adjustment of the LT groups to the animal room conditions was disrupted by the change in going into the reduced stimulation room environment, and, consequently, new adjustments were needed to meet the new external conditions. Many of the stimuli for responses of the Ss in the animal room would be absent in the reduced stimulation room, and the Ss would be in the position of responding to a new total stimulus compound.

The repertoire of responses for caged animals are limited by the

physical environment, and the animal room S's repertoire is likely to be associated with more stimuli external to the immediate cage environment than that of the reduced stimulation room Ss. If, as was the case in the reduced stimulation room, many of the external stimuli available to the animal room Ss are removed or reduced, then going from the animal room to the reduced stimulation room would disrupt this relationship. For the RS Ss this change took place at weaning when comparatively few habits have been established (2), but for the LT groups the change occurred when the LT Ss were approximately 45 days old. This study indicates that the effects of this stimulus change for the LT groups were greater than the effects of reduced stimulation per se, for on the maze trials the LT groups were closer to the MC groups than were either AR or RS groups.

Guthrie (19, 20) holds that if a learned response was prevented by any means and the situation was repeated, then the former responses would be inhibited. When LT Ss were placed on the elevated maze they did not freeze immediately as did the MC groups, but started to explore the maze; on total time spent on the maze during the first four trials the LT group had significantly less time than MC groups ($p=.01$). However, during the first trial on the maze the LT group median, 10, for stability was significantly higher than the RS median, 7, ($p=.002$ by the Wilcoxon-Mann-Whitney test).

The LT groups, then, were conditioned not to run on the maze as running on the maze became a signal for doing what was being done, i. e., slipping on or falling from the maze runway. Thus the maze runway became

a signal for not running, and this facilitated the stamping in of the fine movement responses of defecation and inertness.

Exploratory and Emotional Behavior

As this study has shown, the measurement of exploratory and emotional behavior is very complex. The behavior of the naive rat in the open field does seem to be composed of two broad behavioral classifications: gross movement and fine movement. Another way of thinking of the above dichotomy would be to classify the behaviors as locomotor type and non-locomotor. The latter would describe the fine movement responses of grooming, defecation and inertness or freezing; but there are aspects of gross movement activities which do not always occur concurrent with locomotion or grid entries, for it is possible for the rat to rear or head-bob without moving forward or backward in space.

The trend analysis of gross movement responses, and of the fine movement response, I, made in this study did not indicate an overall trend for the three major groups except in the case of grid entries. In terms, however, of the findings for direction there did seem to be a tendency for the existence of an inverse relationship between gross movements in the field and learning of the elevated maze pattern. Such a reversal in gross movement responses may have been an artifact of the experiment for investigatory behavior on the open field appears different from investigatory behavior on a narrow elevated maze runway. Much more visual-motor skill would be required for the running of an elevated maze than for the comparatively free locomotion possible in the field. If

the pre-experimental treatments for RS and LT groups had an effect upon visual-motor performance, then one would predict the depressed learning score on the elevated maze when the above groups were compared to AR groups. The finding in this study that restricted animals tend to show more gross movement than animal room Ss has been found in other studies (28, 30, 39, 40). Berlyne (4) has explained this as a curiosity drive and Montgomery (32) has described it as an exploratory drive. To both of these authors it is a form of behavior that dissipates with time. Such a drive would account for the dimunition of responses that was found for gross movements over the 19 open field trials. One difference between the experiments of Berlyne and Montgomery was that the latter found that after five days with one trial per day of five minutes each, the exploration by the rat tended to remain at a constant rate. Berlyne would have to postulate another drive interacting with the curiosity drive to explain the constant rate of exploration. In our study after an initial relatively high level of activity, the performance remained fairly constant through 19 trials.

Hebb's (25) recent paper speaks of the arousal system energizing the organism in effect, to seek out stimulation. It could be that the apparent base line of exploration that appears to become the animal's level of responding after initial trials is a function of this internal state. It does not follow that this arousal level exists without external stimulation, however, for there is the constant bombardment of adventious stimulation that may impinge on the organism to maintain a level of activity as a function of interacting with the drive state of the organism.

Further, no matter how constant E attempts to maintain the environment of the Ss there would always be present, it seems to this writer, changes in the proprioceptive centers of the Ss changes in position, handling, and placement in the field.

The present study differed from others reviewed with respect to the effects of restriction in that the Ss of this study remained under the same home cage pre-experimental conditions throughout the experiment. This means that for RS and LT groups the starting of open field trials were attended by new stimuli discussed in the introduction to this chapter. As a function of this stream of stimuli the Ss would be at a high excitement level at the time of introduction into the open field. Thus, introduction into the field could become associated with a high excitement level producing many responses of a gross movement. In addition, the defecation resulting from high autonomic activity and the closely allied inertness and grooming (43), would also become associated with the field stimuli.

The hypotheses of increased locomotion for RS and LT groups as compared to AR groups was upheld. Furthermore, as predicted the LT groups showed a greater effect of previous stimulus deprivation than the RS groups. It was also found that all groups showed a high point for freezing or inertness on the second trial, and this was followed by a relatively constant rate for this response.

A recent study by Hunt & Otis (27) found that a restricted group did not show differences from a non-restricted group in open field measurements; they did find that the restricted Ss did significantly

less emerging in a stove pipe test that followed the field experience. They concluded that the restricted animals were somewhat more susceptible than "experienced" animals to emotional disturbance too mild to produce emotional defecation but sufficiently strong enough to interfere with emergence. The findings for the RS groups in this study support this conclusion in that the RS groups froze more than the AR groups. However, the findings for the LT groups indicate that the defecation response may be attendant to higher excitement levels than the freezing responses, and that it was also accompanied by increased responding on all other variables measured during open field trials—except inertness for first and total trials.

The more diffuse responding of the LT group is in line with the description of the behavior of restricted dogs as reported by Melzack (31). It appears that the late treatment environmental changes had a greater effect upon the elevation of exploratory behavior and "emotional" behavior than did the constant restricted environment as compared to the animal room environment.

The overall picture suggests that the excitement level of the LT groups was heightened most by the stimulus change leading to and including the open field experiences, the AR group least, and the RS between the two; and that these findings were also true for the elevated maze results.

The findings for the comparisons of colony cage environment to isolate cage environment were not as clear cut as those for the major dimensions of animal room, reduced stimulation room, and late treatment environments. In the open field the isolate cage Ss tended to make more

grid entries, and on the elevated maze they tended to be less stable. From the major group comparisons it was inferred that high locomotion in the field was related to less stability on the maze. Although the findings for the cage-type dimension were not conclusive they did suggest the same direction as the major group comparisons.

General Discussion and Conclusions

The present study has resulted in the finding that variation on the dimensions of differences in the amount of stimulation externally present to the white rat result in differences in behavior in the open field and significant differences in performance on the elevated maze pattern employed. Further, it was established that the change from the animal room environment to the reduced stimulation environment had greater effects on the mature or near mature rat than did the same changes have immediately after weaning.

In Chapter I the viewpoints of the writers of two articles spelled out the need for more information concerning the effects of early experience upon adult behavior.

Christie (9) had expressed the view that pre-experimental experiences should be more fully reported in the literature of experiments. In the present study indications have been found and pointed up concerning the influence of certain pre-experimental dimensions. Some of the variables he mentioned that have been employed in this study are the care and maintenance of animals, amount and kind of pre-experimental deprivation, and cages and number of animals in each. Although not consistently

significant in their effect on open field behavior many of the pre-experimental variables have been shown to have had some influence. How these variables of the pre-experimental dimension of this experiment would interact with other testing measures than those employed here is an experimental question. However, the suggestion that differences may exist pre-experimentally, and the finding that they can interact with elevated maze learning sufficiently enough to result in significant differences implies that much care in maintaining pre-experimental records and their consequent reporting in the results of a study will more accurately spell out the generalization from one study to another. Again differences in results may be attributed to such pre-experimental variations, and it becomes "the responsibility of the theorist to demonstrate that the principles uncovered in the study of rats with a restricted background are applicable to the behavior of rats reared under more varied environmental conditions" (9, p. 335). The results of this study would add a further implication to such responsibilities that if there have been major changes in the stimulus compound external to Ss of a study, then those should be demonstrated as being applicable to Ss not experiencing the same major change.

As has been indicated several times in the present study, there is a need in the reporting of studies on exploratory behavior and/or emotional behavior for the inclusion of measures of all the dimensions of behavior usually considered to belong to one or the other of the classifications. It has been shown here that the more diffuse responding of the LT groups in the open field could be equated with many of the

measures used in studies of emotionality, and that this diffuse responding included increased locomotion which is usually used as a measure of investigatory behavior. In the results of this study the dimensions of emotional behavior and exploratory behavior in the face of stimulus change were not clearly divided. If one is interested in the study of either emotional or exploratory behavior, it would seem to be important to measure as completely as possible the dimensions of both gross movement and fine movement.

Research Suggestions

One dimension of pre-experimental variation that could be of importance in the determination of generality of results is the changing of animals from colony to isolate cages previous to experimentation, or vice versa. The present study did not measure this variable, but the indications that some differences between isolate and colony Ss did exist and that these were in the direction of the major group comparisons suggests that changing the cage conditions at maturity or near maturity might produce an influential interaction.

Another area of experimentation that could begin to spell out the relative influences of early versus late restriction would be a study of whether the performances of Ss whose pre-experimental history was that of early restriction and late animal room environments as compared to a group similar to the LT group of this experiment.

The significant F for the analysis of the weights of the Ss from

the groups designated in this study indicates that changes also took place in the internal environment of the animals. It would seem that the studies of Bernstein (5), Weininger (42), and Ruegamer et al. (37) point up the need for investigation of other pre-experimental dimensions than handling and the consequent evaluation of post mortem internal differences.

In the open field measurements the animals that have had restricted environment history made the largest number of grid entries. Is there a linear relationship between stimulus deprivation and open field activity? Is it also not possible that restriction can be so severe or for so long a period of time that the animal will not show the increased responding when compared to non-restricted animals?

On the other side of the same coin is the suggestions that an animal can learn to adjust to change per se. An experiment could be designed wherein the experimental group would be subject to controlled environmental changes which occurred with high frequency, and the performance in the open field of these Ss compared with those of animals from "normal" animal room environments. The findings for the LT groups of this study suggest that the controlled changes employed in the suggested experiment should not be of a type that would be too disrupting for the established habit patterns of the experimental Ss.

CHAPTER V

SUMMARY

The purpose of this study was to determine the effects of varied pre-experimental environments upon the behavior of the rat in the open field and then on the animal's performance on the elevated maze. Within the general conditions of the field and the maze it was decided to measure the dimensions of learning, exploratory behavior, and emotionality. Weights were recorded at the end of the study.

In all, 72 white male rats were used from the University of Tennessee Home Economics laboratory and the Red Bank Laboratories of New Jersey. All were from the Wistar strain.

Three major pre-experimental dimensions were used. The animal room of the University of Tennessee Psychological Laboratory; a reduced stimulation room which was without measurable illumination and of reduced noise level; in addition, Ss were shielded by a cardboard cylinder to further limit stray light and noise; a late treatment environment which was that of the animal room environment until 30 days before experimentation and then the Ss were moved to the reduced stimulation room.

Within each of the three major groupings there were two subgroups: colony cage Ss who lived four to a cage; and isolate cage Ss who lived alone.

For elevated maze comparisons a maze control group was composed of four groups of four Ss each. They were equally divided between UT

and RB strains. There were two colony groups and two isolate groups of four Ss each. All the maze control animals remained in the colony room from weaning throughout the study.

Measurements were divided into the two major classifications of gross movement and fine movement. For the open field the gross movement measures were grid entries, rearing, and head bobbing. Fine movement responses were inertness, grooming, and defecation. For the elevated maze measures were taken of time spent in the first section, total maze time, errorless trials, choice point errors, retrace errors, rearing, grooming, defecation, and stability.

With the animal room groups serving as a base line it was found that little trend existed in open field measures, but that there was a tendency for late treatment groups and the reduced stimulation groups to respond with greater frequency than animal room groups and in that order. Further, it was found that the late treatment groups responded to the first introduction into the field with increased locomotion and defecation, and the reduced stimulation groups with increased freezing and defecation as compared to the animal room groups.

On elevated maze performance it was found that there was no significant difference between the performance of late treatment and maze control groups. The reduced stimulation groups were significantly better than either the late treatment or maze control groups. The animal room groups were significantly better than the reduced stimulation groups.

For the dimensions of colony cage and isolate cage conditions few significant differences were found. Overall the picture for these

comparisons tended to go, for the most part, in the direction of major group differences with the isolate group comparable to the restricted groups.

Mean weights for the maze control, late treatment, reduced stimulation, and animal room groups were found to be significantly different. Rank order was that of maze control, reduced stimulation, late treatment, and animal room groups when ranked from heaviest to lightest mean weight.

These results lead to the conclusion that the history of pre-experimental environments for rats did have an influence on both elevated maze learning and behavior in the open field. The change of environment at maturity or at early maturity had significant effects upon the performance of the animals. The effects of restriction in the young rat had the same effects as it did upon adult rats, but the change in strongly established habits for the adult rat showed the greater effect.

It was further concluded that the dimensions of exploration and emotional behavior in the rat are not separable in terms of the data of this study.

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APPENDIX A

TABLE XXXV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-COL-2-B

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	96	10	5		18	2	2						
2.	1				1		1	2				220	1
3.	1											300	1
4.	1						1					300	1
5.	53	4	3	1	14	2	3	1				100	1
6.	1				1		1					290	2
7.	61	8	2	4	10		1			1	2	20	1
8.	44			2	2		1					100	1
9.	3						3					280	1
10.	6			1	1		1					240	1
11.	2						1					260	2
12.	57	7	2	7	5	2	2	1		1	4	30	1
13.	53	33	9	20	1	3	1		2				
14.	42	14		4		4						80	2
15.	49	8	3	16		2	5	2					
16.	34	5	3	7	4	6	2		2			110	2
17.	22	2		4		7	1					140	2
18.	21			2	1	7						180	2
19.	40	4	2	3		8	10	1	4			40	2

TABLE XXXVI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-COL-2-N

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	103	15	2		23	1	9						
2.	7				1	1	2					270	1
3.	3				3		2					270	2
4.	12				6	1	2					90	1
5.	4						3					260	2
6.	1				2		3					300	1
7.	65	24	7	10	10	1	2						
8.	43	5	4	9		2						60	1
9.	39	6		2	3		4					90	2
10.	47	7	5	6	5	1	5						
11.	32	10	2	5	2							80	3
12.	33	6		1	4		2					30	2
13.	45	8	3	2	4	2	2	2				40	1
14.	71	11	5	9	3	2	2	1					
15.	76	18	6	28	5	4							
16.	14			4		7	1						
17.	63	4	3	17		7	5					20	1
18.	27			5		5						220	2
19.	58	5	2	12	1	8	4					90	1

TABLE XXXVII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-COL-2-RF

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	94	25	7		19	1	2						
2.	88	31	13	2	21		3						
3.	54	20	9	2	12	1	5	2	1				
4.	22			2	2	5		1	1			80	1
5.	73	42	8	1	20	1	3	1	1				
6.	78	24	9	8	16	1	1						
7.	82	14	10	6	17	1	4		1				
8.	73	8	1	6	8		1	3					
9.	124	34	12	17	13				1				
10.	117	30	10	8	12				5				
11.	105	10	3	22		10			1				
12.	13						3			1	4	200	2
13.	85	21	5	15	2	1			1				
14.	15					5				1	4	150	2
15.	45			6	3	6	4					40	1
16.	18			2		4	1					220	2
17.	48	8	8	11	3	7	5					60	2
18.	84	6	4	2	1	5	5	1	5				
19.	96	13	8	14	8		1		3			40	1

TABLE XXXVIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-COL-2-LF

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	65	8	3		16		6					40	1
2.	82	12	4	3	20		6						
3.	7			1				1				260	2
4.	7			1		1						270	2
5.	27			5	6	4	2	1				140	3
6.	30	5	2	2	5	1	4	1				100	2
7.	30	7	2	6	4	2	2	1					
8.	43	5	2	8	2	2	4					30	1
9.	27	2	2	6	2	4	2	3				110	3
10.	18	3	5	5	4	4	1	2				80	1
11.	11				2		5					210	2
12.	107	28	7	24	4	6	4		2				
13.	84	11	5	7	1	7	10	2	3				
14.	91	23	13	20	3	12	7	1	3				
15.	87	7	3	8	4	5	5	2	3				
16.	123	10	3	27		12	4	1	5				
17.	37	22	15	24	2	2	10					40	2
18.	42	16	7	11		12	3		1			60	1
19.	13					9						210	3

TABLE XXXIX

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-COL-1-N

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	53	3	2	2	8	3	3						
2.	7				1							250	2
3.	1											300	1
4.	30	1			3	2	2					100	3
5.	1					4						280	1
6.	2					1	1	1				270	1
7.	15	2			2	2	3					150	2
8.	33	8		2	5	2	1	1				40	1
9.	4					1	3					240	1
10.	41	3	2	6	3	1	4	1	1			60	3
11.	17	1	1			1	4					180	2
12.	46	8	4	4	2		4			1	2	30	1
13.	29	5	3	2	1	1	3					140	1
14.	2					5						280	2
15.	79	22	9	23	1	2	5		1				
16.	67	12	8	15	2		5		9				
17.	64	23	10	12	1	11	7					50	2
18.	97	44	19	19	6	2	4	2	2				
19.	59	5		2	11	6		4				60	2

TABLE XL

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-COL-1-RF

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	51	6	2	4	7		7						
2.	69	2		7	9	2	6					20	1
3.	13	5		1	3		4	1				320	1
4.	8			1	1	2	2					300	1
5.	1					1						300	1
6.	1											300	1
7.	58	11	8	4	5	1	4			1	1		
8.	22			1	4		3					210	1
9.	32	5		1	4	1	3	1				130	3
10.	13			2	1	4		3					
11.	1						3					290	2
12.	21				2		2					250	1
13.	31	1		5		4						220	1
14.	31	4	3	5	1	3		1	2			120	1
15.	43	6		5	4	4	2	1					
16.	47	10	4	10		4		1	2				
17.	51	10	6	9	5	9	15					60	1
18.	35	10		5	5	5	3	1	2				
19.	41	8	2	4		8	4		1			160	1

TABLE XLI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-COL-1-LF

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	1											300	1
2.	55			2	21			1					
3.	2				1							240	3
4.	56	2		2	16				2				
5.	25	1		2	1	1							
6.	25			3	4		3	1					
7.	57				9		5						
8.	25			2	3	3						140	1
9.	32			3	4	1	3	1				40	1
10.	80	6	3	3	16		11						
11.	35	7	2	3	5	1	5					120	3
12.	116	21		12	12		7	1	1				
13.	36	2		5	3	1	1					160	1
14.	47	9	4	3	4	2	2	1				40	1
15.	53	13	5	5	1	6	5						
16.	29	9	4	9		3	3		2			160	1
17.	60	24	7	7	3	9	9		2			20	1
18.	30	1		3		9	2		1			100	3
19.	45	3	2	6	1	7	4					100	2

TABLE XLII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-AR-COL-3-B

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	134	39	12	28		7	14		1				
2.	31	5		3	1	3	5					200	2
3.	1					1	3	1				240	1
4.	55	3			8	1	11					180	1
5.	25	3		3	3	1	8					240	
6.	29	1		4		5	4		1			210	2
7.	32			1		4	3		1			240	1
8.	81	16	5	16	2	3	16						
9.	24			1		1	5					240	1
10.	21			4		3	6					225	1
11.	21	1		1		2	3					270	1
12.	39	9	2	10	5	3	5					180	1
13.	65	3	4	19	7	3	17					105	1
14.	59	4	1	23	2	3	9					120	3
15.	35			14	2	3	9					150	3
16.	37	3	3	18		3	6					150	3
17.	16	2		4		3	4					285	1
18.	21			3	1	2	3					180	2
19.	24			10	3	1	9					210	1

TABLE XLIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-AR-COL-3-N

Trial	Variables OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	51	4	1	28	3	4	3	2		1	4	100	1
2.	22			9	3	10	3	1		1	4	180	2
3.	13			2	2	1	2			1	6	240	1
4.	17			7		1	3			1	1	220	1
5.	12			3		2	1			1	4	270	1
6.	57	5	1	18	2	7	3			1	7	130	4
7.	41			8	3	9	4	1		1	5	120	2
8.	88	7	3	39	3	6	8						
9.	7			1		1	3			1	10	285	1
10.	8			1	1	3	3	1		1	4	285	1
11.	3						4			1	2	285	1
12.	51			12	5	3	5	1		1	7	195	1
13.	29	2				2	6					245	2
14.	6			1		2	3					255	1
15.	23			3	2	2	2			1	5	270	2
16.	38	4	2	4	4	2	7					75	3
17.	27			6		1	4			1	8	225	2
18.	42			3	6	1	4					255	1
19.	58	5	2	19	3	2	13					120	5

TABLE XLIV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-AR-COL-3-R

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	172	4	1	12	2	5	22	2	1	1	4		
2.	129	8	1	9	1	10	15	3	1	1	1	20	1
3.	97	4		3	2	3	19	2		1	3	140	1
4.	94	6		11		5	17	2	2			60	2
5.	106	6	2	16	1	4	20	3	1			45	1
6.	95	10	3	2	2	13	10	2				15	1
7.	88	17	5	4	2		18	2	1				
8.	70	15	3	4	1	4	10	1				120	1
9.	43	1		1	1	5	8					180	3
10.	12						4					255	3
11.	11			1		1		1				285	1
12.	21					1	4		1			255	1
13.	33			2		1	7					210	1
14.	6						2					285	1
15.	13						3	1		1	2	240	1
16.	17	1					5					270	1
17.	6				1	1	2					285	2
18.	4				1	1	1					285	2
19.	3					1	1					290	2

TABLE XLV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-AR-COL-3-L

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	168	3		33	1	6	4	1				20	1
2.	18			7		4	5			1	2	240	1
3.	20			4	1		3			1	1	240	1
4.	61			7	2	3	7	2		1	1	180	2
5.	55	9	3	8	1	2	11			1	2	195	1
6.	11			2		2	1			1	2	270	1
7.	43	7		5		1	3			1	5	210	1
8.	73	1		22	2	3	9					135	1
9.	54	7	5	9	4	5	6			1	3	150	1
10.	69	4	2	7	1	1	5			1	2	210	1
11.	21			4		3	3	1		1	4	255	2
12.	55	7	3	8	2		6			1	7	210	1
13.	53	3	2	14	3	1	12			1	2	165	3
14.	23	3		10			6			1	1	225	2
15.	24	2		3	3		11					225	2
16.	32	1		5			6			1	4	240	1
17.	29	2		9			7					195	3
18.	24	1		3	1		5					225	2
19.	21			8	2	2	4			1	2	240	1

TABLE XLVI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-ISO-4-H

Trial	Variables												
	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	75	2		1	12		1					80	1
2.	85	7			14	1	5						
3.	17						1					210	2
4.	10				3	1		1				180	1
5.	26	1		1	6		2	2				80	1
6.	1					1	3					280	1
7.	26											210	1
8.	41	2	3	3		3	3					20	1
9.	33	4	2	1	5			2	1			120	1
10.	14				3	5		1				160	1
11.	50	2		3	1	3	2		1			10	1
12.	52	7	3	4	6		1					20	1
13.	101	3		7			2		4				
14.	126	34	3	14		3	1	1	3				
15.	30			2		4			1			100	1
16.	88	21	7	19		2	4		5				
17.	93	13	6	10	4	7	5		1			40	1
18.	57	8	1	10		8	4		1			30	1
19.	132	42	18	46	1	4	2		1				

TABLE XLVII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-I-34H

Trial	Variables OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	87	1			19	3	6						
2.	74	1			13	1							
3.	26				3		3					130	2
4.	1				3	2	2					260	1
5.	1					1	2	1				240	1
6.	46				9		3	1				120	3
7.	1				1		3					300	1
8.	5			1	3	5						280	2
9.	1				1	4						300	1
10.	8				2	1	3	1				210	1
11.	1					1	3					300	1
12.	8					1	1					200	3
13.	1				1	5			1			300	1
14.	56			10		3	6						
15.	37			5	2	3	2					40	1
16.	1			1		4						300	1
17.	33			1		10	3					120	3
18.	7				3	4	1					230	3
19.	10			3	1	5	3					220	2

TABLE XLVIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-Iso-100

Trial	Variables OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	84	3			10			2					
2.	20				1							160	3
3.	6											260	1
4.	8				1	1						220	1
5.	57				4	3		2					
6.	3				2	1	3					250	3
7.	47	2	1	1	6								
8.	9			1	1		2					200	1
9.	8					2						200	2
10.	2						2					270	2
11.	2			2		1	2	1				290	1
12.	4			3	1	3						120	2
13.	56			10	1		3						
14.	80	7	1	16		4	2		2				
15.	71	5	2	12	1	6	1		1				
16.	74	13	3	23	2	2	6		1				
17.	66	5	3	12	3	8	3		1			20	1
18.	73	6		9		8	6		1			80	3
19.	91	17	8	19	3	10	10		1				

TABLE XLIX

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-ISO-101

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	56	2			2		8			1	2	80	1
2.	91	1			20		4	1					
3.	34				14	1	4					120	2
4.	33				8	2						20	1
5.	43	3	2		7	3	7					40	2
6.	46			1	7		5	1				60	2
7.	22	1		4	2	1	5					140	2
8.	49	2		5	5	1	2	1					
9.	26			1	1	1	1	2				200	2
10.	43			1	5		1					80	1
11.	41	1		3	2		2					60	2
12.	95			10	6		2	1				80	2
13.	145	17	6	14	8		2	1	1				
14.	105	18	4	26	3	4		2					
15.	36	3	2	10	1	2		4	3			40	1
16.	100	24	15	21	4	4	7	1	3				
17.	140	39	6	37	5	2			1				
18.	119	40	14	40	2	6	1		1				
19.	139	27	16	26	6	7	12		1				

TABLE L

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-AR-I-301

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	126	3		28	2	5	5						
2.	99	3		14	6	4	16		1			50	1
3.	20			1	1	4	2	2				240	1
4.	30			10		2	9		1			165	1
5.	1			1		1	2					285	1
6.	31			6	2	7	2					180	1
7.	12			5	3	6	3	1				225	2
8.	48	7		23	3	5	11	1				75	2
9.	32			6	2	2	5	1		1	3	225	1
10.	16			1			5					255	1
11.	37	13	2	1	4	3	12	2				120	2
12.	102	5	3	17	2	12	1					15	1
13.	49	11	2	11	4		16					60	3
14.	47	13	1	6	3	1	12	1				150	4
15.	59	7	2	4	5		18					60	3
16.	1						1					300	1
17.	27	12	4	14	3	1	10		1			180	4
18.	63	11	5	22	3	2	24					75	3
19.	28	7	2	9	3	1	13					180	3

TABLE LI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-AR-I-302

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	125	3		25	4	9	14						
2.	9				1	2	1					260	2
3.	22			7		4	5			1	4	230	1
4.	6						1			1	2	285	1
5.	13			5	1	5	2	1		1	6	240	1
6.	8			2		2	1			1	7	270	1
7.	27			5	1	3	9					225	2
8.	27			8			4			1	6	210	2
9.	68	12	4	27	2	7	8			1	8	45	2
10.	79	10	4	28	1	2	10			1	4	15	1
11.	69			12	3	5	6					135	2
12.	109	13	9	27	2	3	15			1	9	30	1
13.	88	9	10	35			13			1	3		
14.	75	7	4	30	2		11					15	1
15.	148	18	9	36	4	1	9						
16.	70	17	9	20	1	6	6						
17.	61	5	1	19	1	3	13			1	4	90	3
18.	6			21	1	2	16			1	3	30	2
19.	68	3		17	3	2	16		1			90	3

TABLE LII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-AR-I-20-303

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	28			5	3	5	3			1	2	220	1
2.	36			9	4	5	8			1	2	120	1
3.	92			16	1	6	6	2		1	7	40	1
4.	5			2		1				1	6	285	1
5.	13			4	2	2	3	1		1	1	240	2
6.	37			8	1	5	3			1	8	150	1
7.	31			2	1		7					240	1
8.	27			1	1	2	4			1	6	225	2
9.	18			3	4		11					255	2
10.	1				1	3						285	1
11.	11			1	1	1	4					270	2
12.	135	10	3	27	4	1	16						
13.	100	29	14	30	3	2	15	1					
14.	81	5	4	18	3	2	19					60	2
15.	67	20	9	23	2	2	14		1			45	1
16.	30	1		3		1	4					225	2
17.	66	6		10	1	2	18					90	2
18.	83	11	3	18	8	1	29		1			45	3
19.	66	8	5	14		2	12					105	2

TABLE LIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-AR-I-304

	Variables											
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	138	3		12	1	4	23	1	1				
2.	49			2		5	8		1			240	1
3.	26			1		1	5	1		1	5	240	1
4.	6									1	2	290	1
5.	6			1		1	1			1	6	290	1
6.	6			2			1					240	1
7.	21					2	2					270	1
8.	21					2	5					240	1
9.	16			2	1	2	4		1			240	1
10.	21				1	2	2					240	1
11.	27			1	1	4	5					240	1
12.	52			5	1		9	1				105	4
13.	23			5		3	3	1				240	3
14.	35			7	1	2	10	1				165	3
15.	21			1	1		5					255	1
16.	6					1	2					285	1
17.	17	1		1			4		1			270	2
18.	18	1			1	1	5					270	1
19.	37			5	1	1	13					180	4

TABLE LIV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-SP-R

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	76	1			13	3	4						
2.	55	7	5		8	2	4	1				30	1
3.	29			1	3	2	3	1	1			180	3
4.	1						2	1				285	1
5.	18			1			2					200	2
6.	32			2	5		4			1	4	70	3
7.	43	2		1	7	1	6	1					
8.	58	8		8	5	2	4			1	2	30	1
9.	64	8	2	5	8	2	7		2				
10.	53	8	3	4	4		7					40	1
11.	75	7		7	4	3	6	1	1				
12.	36				2	2	5					110	1
13.	63	5	1	11	2	7	5		1			60	1
14.	55	12	4	12	1	5	5						
15.	95	6	1	17	4	4	6						
16.	103	16	7	12	3	2	12		3				
17.	35			6	1	8	3					180	2
18.	74	1		10	4	11	9		1				
19.	46			7	2	9	5		2			60	1

TABLE LV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-AR-SP-L

Trial	Variables												
	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	101	3	2	5	16	2	7						
2.	12				3							140	1
3.	12				6							100	2
4.	5			2	6	3	1					260	1
5.	1						4					290	2
6.	2				3		3					290	2
7.	41			4	8	1	6					40	1
8.	11			3	2	2		4	1			180	2
9.	1			2	1	1	2					280	2
10.	5			1	1	2	2					270	3
11.	8			1		3	1					255	3
12.	39				5		2					20	1
13.	42	7	6	7	4	3	5					30	1
14.	50	6		11	1	5	4	1					
15.	27	3	1	3	4	6	6		2			60	2
16.	8			3		5	2					220	2
17.	32			4	2	9	5					150	3
18.	29			4	1	6	3		2			140	3
19.	24	1		7		7	4	1	1			190	3

TABLE LVI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-COL-B

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	69	1		2	7	1	3			1	4	60	1
2.	96	3	2	3	9	3	4	1				20	1
3.	98	6	3	4	11	3	5			1	3		
4.	27	3	3	2		4	2			1	3	100	1
5.	61	2		5	1	2	2					40	1
6.	77	20	8	5	17	3	3			1	5		
7.	85	13	8	6	9	3	5			1	3		
8.	87	24	15	14	6	4	5			1	2		
9.	81	6	1	6	9	3	4	1		1	2	20	1
10.	147	17	14	14	12								
11.	97	14	6	6	11	4	4						
12.	68	2		3		1	6			1	5	20	1
13.	47				1	2	2					180	1
14.	75	11	4	3	1	7				1	3	60	1
15.	153	10	9	15	3	3				1	4		
16.	56	6	1	5		4	3		1			120	2
17.	65	11	7	10	1	6	4			1	3	80	1
18.	158	21	6	13	1	4	13			1	2		
19.	115	17	9	17	1	1	6			1	2		

TABLE LVII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-COL-N

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	104				9	1	6			1	24		
2.	65	11	6	3	9	2	4			1	3		
3.	69	12	5	9	11	5	3			1	2	20	1
4.	16					3			1			210	1
5.	87	11	6	7	6	1	4			1	4		
6.	73	16	4	4	7	3	4			1	5	80	2
7.	56	3	2	3	8	3	4						
8.	89	16	8	6	9	5	5			1	4		
9.	89	17	5	17	7	8	5			1	2	30	1
10.	73	2	2	6	8	4	4					130	
11.	66	25	13	8	6	3	3		1			50	1
12.	54			3		4	4					60	1
13.	51			2		2	1			1	3	90	
14.	67	3		4	2	6	4					100	1
15.	59			7		9						110	2
16.	48	3		10	1	8	1					140	1
17.	40			7		6	1	1	1			130	2
18.	56			4		11	5					110	3
19.	98	15	4	14		7	7		1				

TABLE LVIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-COL-RF

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	45	5		1	5							80	2
2.	78	1		4	4	3	3						
3.	45	1		2	9	2	3					120	2
4.	67	3		1	7	2	5		1				
5.	25			1	2	2	1					160	2
6.	68	11	1	2	10	2	2						
7.	99	7	8	4	3	2	9		2				
8.	142	22	7	5	16	2	7		1				
9.	85	10	2	5	7	1	6		1			20	1
10.	119	23	12	3	15	1	9						
11.	98	19	8	9	7	1	6						
12.	39			1	4	6	1			1	2	60	2
13.	61	5	2	6		3	4		1	1	3	120	1
14.	66	3	2	5	1	3	4					240	1
15.	54	4		6	1	1	4					120	1
16.	42	4		2	2	5						140	1
17.	76	7	5	11		8	4		1			40	1
18.	76	13	8	7	2	7	8						
19.	114	18	12	29		5	5						

TABLE LIX

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-COL-L

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	62	10	3	1	7	2	4					30	1
2.	57	3	4	1	9	1	4					20	1
3.	113	5	1	6	10	6	4	1					
4.	20				2	1	2		1			150	1
5.	36			2	4	4	3					90	1
6.	67	32	17	5	5	3	6			1	4		
7.	92	8	3	6	6	4	7						
8.	81	17	15	13	4	7	4			1	2		
9.	81	30	19	16	6				1	1	2		
10.	93	10	5	15	6	5	3						
11.	21			1	2	2	2					160	2
12.	68	8	5	6	1	7	5			1	3	60	1
13.	95	18	12	8		3	5		1	1	2	30	1
14.	91	6	2	7	1	6	4			1	5	40	1
15.	97	25	10	11	3	2	5		1	1	2		
16.	55	10	9	5	2	7	4		1	1	2	60	1
17.	114	11	14	9		12	3						
18.	44	5		5	3	6	10					100	1
19.	92	17	8	22	2	12	1						

TABLE LX

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-COL-2-B

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	19			13		6				1	5	180	1
2.	5			4		3	2	2		1	3	240	2
3.	40	3	2	5			2	2		1	3	200	2
4.	18	2		6		8	2			1	6	200	2
5.	16	4	3	5	1	1	4			1	5	210	1
6.	45	5	2	10	2	13	9	1	1	1	1	90	2
7.	57	3		8		7						150	1
8.	28	13	5	22		8	1			1	6	90	2
9.	56	39	12	29	5	2	8		1			15	1
10.	15	28	11	28	1	5	4			1	1	150	1
11.	22	14	6	17	4	2	11					120	1
12.	78	14	9	44	2	3	11	1		1	4		
13.	38	5	3	19	3	4	8			1	4	150	1
14.	35			7	2	3	6			1	3	210	3
15.	28	6		8	4	3	9					225	1
16.	60	29	18	36	2		13			1	2	45	2
17.	63	20	8	18	2	1	16			1	5	60	1
18.	39	2	2	17		2	13					195	1
19.	23	2		2		1	1		1			240	1

TABLE LXI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-COL-2-N

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	110			16	1	3	6	1	1	1	9	50	1
2.	26	2		2	1	2	2	2		1	2	260	1
3.	60	6	1	13		1	4	3		1	2	140	1
4.	20	3	3				4			1	7	260	1
5.	23				1	2	4	2		1	1	240	1
6.	47	4		9		3	10	3		1	4	165	1
7.	25	6	3	4		2	6	1				180	1
8.	59	12	2	6	1		8	2	2			165	1
9.	80	5	1	9	3	8	11	3				45	2
10.	21	8	2	1		4	7	2				225	1
11.	22	8		2		2	6	1	1	1	1	255	1
12.	93	20	6	11	1	2	9	4		1	2	105	2
13.	23					1	2		1			255	1
14.	8			1		1	2			1	3	285	1
15.	31	10		2	1		5	1				225	1
16.	37	5	3	8	1	3	9			1	1	225	2
17.	37			3	2	1	9			1	4	210	1
18.	30	5		8	3		9	3				210	1
19.	21			2	1	1	5		2			240	1

TABLE LXII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-COL-2-R

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	87	22	11	32		2	1	1		1	4		
2.	102	6	3	18	2	2	12	1		1	2		
3.	54	6	4	14		3	5	3	1	1	3	120	1
4.	24	5	2	3		3	2	1		1	4	200	1
5.	23			7		3	4					225	1
6.	20	5		5	1	7	1			1	1	240	1
7.	28	6	2	1	1	2	5	2		1	1	240	1
8.	50	11	3	10	1	3	3			1	2	180	1
9.	120	9	4	18	5	6	26	1					
10.	22	2		2		4	3	3				225	1
11.	5			1	1	4	3	3		1	7	270	1
12.	34	8	2	11	3	3	6	1		1	5	210	1
13.	52	11	6	2	3	2	12					180	3
14.	27	2		1	1	2	4	4				240	1
15.	28			4	1		9			1	3	210	1
16.	50	3		12	1	1	11			1	2	165	2
17.	29			7	1	2	10	3				225	2
18.	36			4	3	1	17	4	2			195	4
19.	26	5	1	3			4		1			255	1

TABLE LXIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-COL-2-L

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	87	4		16	5	3	3	2	1	1	2		
2.	99	2		9	3	3	5	2	1			100	1
3.	40	4		5	1	2	7			1	2	180	1
4.	36	1		4	2	3				1	5	210	1
5.	24	2		2	3	1	2					230	2
6.	43	7	2	8	2	3	9	1				180	1
7.	23			5		4	3	2		1	2	240	1
8.	98	4	2	29	7	6	3					45	1
9.	64	2	3	21	3	6	4					105	1
10.	41			5	4	4	6	1				150	3
11.	48	3	1	21		5	11		1			135	3
12.	35	2	2	16	2	4	9		1	1	5	120	1
13.	26	3		9	4	3	5					225	1
14.	38	3	2	6	3	1	8		2	1	4	165	4
15.	42	2	2	9	2	5	4					210	2
16.	23	2	1	17		3	4					255	1
17.	22			9	5		5					240	1
18.	19	3	2	5	2		8					230	1
19.	20	7	2	5	3		8					240	1

TABLE LXIV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-COL-3-B

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	40	2	1	1	4	4	10	2				180	3
2.	8						2	1		1	3	260	1
3.	16			3	1	2	5	1		1	4	240	1
4.	13			1	1	1	5					255	2
5.	47			10		5	12	3		1	2	105	3
6.	85	11	3	23	2	7	5	3		1	4		
7.	26			2		2	8	1				210	1
8.	15						5	1				240	1
9.	21					1						270	1
10.	63	5	6	12		5	12		1			90	1
11.	43	3	3	5	1	2	10	1				150	2
12.	37	2		7	2	1	9	2				180	1
13.	22	1		3		1	2		1			255	1
14.	45	3	1	9	3		12	1	1			250	2
15.	36			9		1	2					240	1
16.	81	5		18	5	3	17					75	2
17.	71	9	4	12	2	2	18	1	4			90	1
18.	32			3	2		6	1	1			255	2
19.	55			9		2	11	1	2			135	3

TABLE LXV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-COL-3-N

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	120	12	1	17			12	2	2			60	3
2.	38	2		7		1	1	2				200	2
3.	81	13	1	6	1	4	15	5				70	3
4.	17	8		2		1	3	1	1			240	1
5.	79	8	3	7		3	15	3		1	4	120	2
6.	44	4	3	5	3	3	5					180	1
7.	23	8	2	9	6	3	6	4				120	1
8.	43			4	3	5	12	1				180	1
9.	75	14	4	15	4	4	14	3				30	2
10.	102	5	5	25	2	1	19					15	1
11.	62	8		23	2	2	10	1				30	1
12.	69	4	2	17	6	2	10	2				60	2
13.	72	5		21	3	1	14	1				30	1
14.	45			12	1	4	7	1	1			210	3
15.	83	6		30			10	1	3			45	1
16.	101	12	4	39		1	22	1	1				
17.	46	6		9	1	1	12	3	1			180	4
18.	89	5	2	13	2		21	4	1			225	2
19.	77			14	3	1	19	2	2			145	4

TABLE LXVI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-COL-3-R

Trial	Variables OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	52	11	6	13		2	9	1		1	4	140	2
2.	77	8		21	2	4	3	3	1	1	3	80	1
3.	6	2	3				2	2				260	2
4.	39	4		4		2	7	1				230	1
5.	54	6	2	8	3	3	14	1				135	1
6.	49			4	4	8	5					180	2
7.	20				3	1	7					240	1
8.	21	2		4	1	4	3	3				225	2
9.	21	2		3	1		6	1				225	1
10.	7			1	1		5		1			270	2
11.	52	4	3	7	7	1	11					90	2
12.	45	6		5	1		5	2				210	1
13.	79	13	5	10	4	3	13	1	1			105	5
14.	34	3		3	3	1	5	2				255	1
15.	66			13	1	1	10	4	1			120	1
16.	100	12	6	18	3	9	23						
17.	74	4		13	2	2	11	1	1			120	4
18.	12			16	1	4	8	2				90	4
19.	46			6	1		14	2	1			180	3

TABLE LXVII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-COL-3-L

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	108	6		20	1	5	5	2		1	4	70	2
2.	58	1		5		4	3	3		1	6	120	1
3.	35			2	3	2	1	2		1	2	240	2
4.	39			5	1	4	8			1	1	210	1
5.	51	1		9	1	3	10	2		1	4	150	1
6.	64	9		2	2	7	10					75	2
7.	54	5	3	8		7	12	2	2			120	2
8.	36	1		3	3	4	7	3				165	4
9.	52	7	2	9	3	4	8	3				120	2
10.	98	24	16	26	2	6	10	2	1			15	1
11.	61	19	8	25	3	3	11	1	1			15	1
12.	87	16	1	26	5		14					60	3
13.	77	10	2	33	1	2	7	1				30	1
14.	38	5	2	8	4	3	4					210	2
15.	86	17	8	44		1	6						
16.	68	21	11	33	5		8	1	1			30	1
17.	93	14	6	28	6		12	1	5			60	3
18.	98	18	15	33	6	1	15	1					
19.	85	24	15	27	1	4	7	1					

TABLE LXVIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-ISO-9H

Trial	Variables												
	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	85				8	2	4					110	1
2.	60			2	3	3	3					30	2
3.	42			1	1	3						60	1
4.	23					1	1					150	2
5.	49	2		1	9	3	4						
6.	44	6	2	2	5	1	6					45	3
7.	91	27	7	1	13	4	8		1				
8.	74	13	5	5	3	4	5						
9.	49	4	2	1	1	3	6					70	3
10.	52	5	3	4	4	2	3						
11.	32			2	6	3	4					60	2
12.	106	1		5	6	5	6			1	1		
13.	111	11	6	14	4	4	7						
14.	114	29	9	15		5	6						
15.	64			8	3	6	3						
16.	13			1		4	2					160	3
17.	160	27	12	21	3	5	7					40	1
18.	170	19	4	28	5	5	8		2			20	1
19.	75	4		3	2	8	5		2			40	1

TABLE LXIX

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-ISO-17H

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	113			7	15	2	5						
2.	139	7	2	1	10	2	5						
3.	35				2	1						170	1
4.	112	7	2	1	4	1	5						
5.	104	12	6	2	12								
6.	92	18	7	2	9				1	1	1		
7.	101	11	5	4	11		6	1	2				
8.	86	3	2	4	5		1		2			60	1
9.	109	21	7	4	9	2	4						
10.	106	17	17	8	15	2	2		3				
11.	64	5	3		3	1	3					90	1

TABLE LXX

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-ISO-20H

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	68	2		2	15	2	6					20	1
2.	100	3		2	13	2	6						
3.	79	3	2		9	1	7						
4.	41	6		1	1	2						100	2
5.	72				12	1	5						
6.	41			1	6	2	3					40	2
7.	67			6	6	3	2		1				
8.	60			3	1	1	3	1	1				
9.	56				5	2	2						
10.	63	1		6	6	2	3	1					
11.	73	2		5	4	3	6		1				
12.	88	3		1	2	3	4						
13.	37					3	2					150	3
14.	66	2		2	1	8	3						
15.	198	17	6	24	1	1							
16.	89	1		12		5	9						
17.	219	2		26	1	9	5						
18.	245	16	1	20	4	9	2						
19.	163	15	12	11	1	7	7		2			20	1

TABLE LXXI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-ISO-201

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB--	W	S	D	NB	I	FI
1.	94				12	1	10						
2.	98			2	6	1	10		1				
3.	47				5	1	6						
4.	17				1	1	4					120	1
5.	30				4	1	3					95	3
6.	39				3		4					200	1
7.	11			1		1						240	1
8.	55			2	4		2					80	2
9.	11				1	1	3					180	1
10.	84			2	9		6						
11.	33			1	1	4	3					140	2
12.	94				7		3			1	5	60	1
13.	79			5	1	2	3					30	1
14.	48	1		3		7						110	2
15.	176	33	3	27	6	3	10		1				
16.	107			2	6		2					35	2
17.	230	25	13	36	2	6	2						
18.	199	18	11	23	5	4	1		1				
19.	161	7	1	8		9	9		2			20	1

TABLE LXXII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-ISO-204

	Variables											
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	73	2		3	13	1	8						
2.	51				1	1	5			1	1	60	1
3.	19				2					1	1	160	1
4.	31				3	1	4			1	2	180	
5.	74			1			10			1	5		
6.	39	5	2	2		1	6			1	3		
7.	57			2	4	1	5		1	1	1		
8.	44			4	1		2					60	2
9.	51			4	5	2	4	1				60	2
10.	68	2		5	8	4	5		1				
11.	34	3	1	6	1	1	1					80	3
12.	85			1	6		5						
13.	90			7	1	3	1			1	1	40	1
14.	79	7	1	3	1	5	5	1				60	2
15.	36	10	5	8	4	4						80	3
16.	35			10	3	5	2	1	1			20	1
17.	69	3	2	3	8	5	3	1					
18.	135	22	16	25		4	12		1				
19.	65			7	3	10		2	4				

TABLE LXXIII

NUMBER OF RESPONSES PER VARIABLE ON EACH
OPEN FIELD TRIAL FOR UT-RS-ISO-206

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	95	2			18	3	7					50	1
2.	38			2	2	1	4					100	2
3.	7											260	2
4.	8					2				1	5	260	2
5.	45	2			8	2	5						
6.	6			1			3			1	4	260	2
7.	5					1	3			1	6	220	3
8.	31			1	4	2	3					110	2
9.	48	4		3	1	3	5			1	2	50	2
10.	39			2	4	3	5	1					
11.	11				3	2	4					240	2
12.	34				5	3	5			1	3		
13.	37			6		3	3			1	1		
14.	45			12		6	2						
15.	34			8	2	5	5					20	1
16.	50			7	1	7	2					100	3
17.	75	1		9	3	8	3			1	5	40	1
18.	127	4	2	28		10	14		2			20	1
19.	59			11		8	5		1				

TABLE LXXIV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-ISO-210

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	63	3			7	2	2			1	2	80	2
2.	15				1							240	2
3.	17			1		1				1	2	230	2
4.	12				1	4						240	1
5.	9				3		1					220	1
6.	7					1	1			1	2	210	3
7.	3				1		3					280	1
8.	6				1	1	2					270	1
9.	26			3	3	2	2					200	2
10.	6				2	1	1					220	2

TABLE LXXV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-ISO-220

Trial	Variables												
	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	148	7	2	21	3	4	6						
2.	70			1	7	1	6			1	1		
3.	63	2	2	3	4	3	4		1				
4.	49	2			8	2	4		3				
5.	14			1		2	3			1	3	200	1
6.	43	7	2	2	4	1	3						
7.	15			1	3		5					210	4
8.	10			1	2	1	3					210	1
9.	26	4	2	3	1	3						170	3
10.	34			4	2	1	5					90	1
11.	43			3	4	2	4					60	2
12.	81	4	3	3	4		8						
13.	52	14	4	11		6	2						
14.	36	25	16	15	3	2	7						
15.	39	6	6	6	3	5	2						
16.	52	8	5	6		7	3					60	2
17.	88	14	8	25	5	10	4		1				
18.	120	26	11	30		11	3		1				
19.	47	8	5	15		15			1			40	1

TABLE LXXVI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-SP-R

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	76	5	4		15	2	3		1			15	1
2.	15				3							200	1
3.	3			1	1		1					230	3
4.	3			1		1				1	2	255	2
5.	3					2	3	2				300	1
6.	8				2		5	1				190	2
7.	1			1			2					280	1
8.	68	5	3	2	7	2	3	1	2				
9.	55	12	2	3	8	3	4		2				
10.	80	10	3	1	11	6	3		1			50	1
11.	45			2		2	4		4			30	1
12.	95	7	2	4	13	5	7		3				
13.	83	20	13	19	6	10	6		4				
14.	73	17	2	21		6	3	1	2				
15.	69	16	8	11	6	4		1					
16.	68	25	6	19	3	9	12		1				
17.	82	16	2	24	1	12	6	1	2			40	1
18.	48	8	2	10		6	2		5			100	3
19.	99	22	2	31	4	4	7		3				

TABLE LXXVII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR UT-RS-SP-L

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	123	11	2		12	4	8						
2.	89	7	3	3	13	3	7						
3.	10					1						280	3
4.	25			3	2	1						160	1
5.	15				1	1	3					250	2
6.	19				4	1	5	1				180	5
7.	74	12	6	3	5	2	7		1				
8.	38			2	1		6					150	2
9.	12				2	2						250	2
10.	77	2	1	1	6	2	5		1				
11.	84	8	6	5	7	4	2					10	1
12.	105	2		3		2	6						
13.	58	2		4	5	4	4		1			100	1
14.	51			5	1	4	5					60	1
15.	51			5	2	4	1					40	1
16.	70			3		6	5		1			40	2
17.	53			1		7	2					160	2
18.	128	10	2	6		13	6					20	1
19.	71	5		8	3	13	4					20	1

TABLE LXXVIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-DR-ISO-401

	Variables												
Trial	OG	MG	IG	FR	FR	HB'	HB-	W	S	D	NB	I	FI
1.	95	7	4	43	7	3	10	1				20	1
2.	36			12	6	3	5	1		1	1	200	1
3.	11			3	2	1	4					240	1
4.	6			1	1	3						290	1
5.	22			5	2	4	5					180	1
6.	81	5	3	13	2	1	12	2				150	2
7.	22			10		2	2			1	2	240	1
8.	26			3	1	4	4					240	1
9.	91	9	7	15	1	3	18	2	1			60	1
10.	41			4		2	6	1				205	1
11.	31	3		2		3	2	2				225	1
12.	84	8	4	9	5	2	9	1				150	2
13.	42			4	1	2	9			1	4	225	2
14.	106	5		18	6	3	15	2	1			125	6
15.	55	3	2	14	3	4						135	4
16.	39	3		6	2	1	11					245	1
17.	69			10	4	2	18	1	1			135	2
18.	29			1		1	9			1	2	240	2
19.	22			2	2	1	5		1			240	2

TABLE LXXIX

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-ISO-402

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	110	13	7	22	4	2	7			1	9	10	1
2.	1					2	3	1		1	8	280	1
3.	21			4	1	1	3			1	4	240	1
4.	22			4	1		7			1	4	230	1
5.	12			2	1	4	1					255	1
6.	11			3	1		5	1		1	7	255	1
7.	44			8	1	4	4	1		1	2	105	2
8.	3			1			1			1	2	270	1
9.	14			1	1	2	5					240	1
10.	35	2	2	2		3	4					165	2
11.	3			1		2	1	1				300	1
12.	23			5		5	2	1	1			255	2
13.	54	4		9		2	7					180	3
14.	1						2					300	1
15.	1						2					300	1
16.	17			2			3					270	1
17.	1						1					300	1
18.	2					1	3					300	1
19.	24			2		1	7					255	1

TABLE LXXX

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-RS-[illegible]SO-403

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	109			14	4	2	21			1	1	95	1
2.	1									1	1	290	1
3.	1					1				1	1	300	1
4.	1					1				1	5	290	1
5.	1					3		2		1	2	285	1
6.	34			2		3	6			1	6	180	2
7.	26					6				1	1	240	1
8.	47			6		7				1	4	180	1
9.	18					1	4			1	6	255	1
10.	15	3	2			1	5			1	2	270	1
11.	11				1	2	4					270	1
12.	47	2	2	4	3	5	11			1	1	135	4
13.	34	2		4	1	5	12	1				180	4
14.	59	4	1	7	3	6	10					150	4
15.	64			1	1	1	13			1	3	135	4
16.	25	3		2		2	11					165	4
17.	64	8	3	10	1		16					120	2
18.	29			2		4	8					210	4
19.	50			7			19					120	4

TABLE LXXXI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR LT-RS-COL-4-B

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	56			19	1	3	8	2		1	5	100	2
2.	14			4		1	3			1	5	240	1
3.	12			2	2	1	2					240	1
4.	37			8	3	5	10	4				180	2
5.	11			3		3	3					265	1
6.	7			2	3	3	1			1	3	225	1
7.	30	3	2	16		5	1					180	1
8.	52	10	3	17	1	3	5	1				120	1
9.	7			2	2	2	3					265	1
10.	8			9	3	5	1					285	1
11.	33	6	2	7	1	2	7	2	2			210	2
12.	17	4		2	2	1	7					225	2
13.	13				2	1	1					270	1
14.	35	12	2		6	11	12	2				165	3
15.	29	6	2	12	1	2	5					165	1
16.	62	26	2	30	9	3	1	1				75	2
17.	8			6	1	2	3	1				255	1
18.	8	2		1	2	1	3					235	1
19.	24	7	2	13		2	8					225	1

TABLE LXXXI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR LT-RS-COL-4-B

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	56			19	1	3	8	2		1	5	100	2
2.	14			4		1	3			1	5	240	1
3.	12			2	2	1	2					240	1
4.	37			8	3	5	10	4				180	2
5.	11			3		3	3					265	1
6.	7			2	3	3	1			1	3	225	1
7.	30	3	2	16		5	1					180	1
8.	52	10	3	17	1	3	5	1				120	1
9.	7			2	2	2	3					265	1
10.	8			9	3	5	1					285	1
11.	33	6	2	7	1	2	7	2	2			210	2
12.	17	4		2	2	1	7					225	2
13.	13				2	1	1					270	1
14.	35	12	2		6	11	12	2				165	3
15.	29	6	2	12	1	2	5					165	1
16.	62	26	2	30	9	3		1	1			75	2
17.	8			6	1	2	3	1				255	1
18.	8	2		1	2	1	3					235	1
19.	24	7	2	13		2	8					225	1

TABLE LXXXII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR LT-RS-COL-4-N

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	100	24	6	23	3	1	22	2		1	4	40	2
2.	60	3	2	22	1	1	7			1	2	40	1
3.	30			10		1	10					180	1
4.	90	7	3	31		2	18						
5.	58	3	3	28		2	10						
6.	73	6	3	30	1	3	9	1					
7.	77	9	6	28	3		4						
8.	99	12	8	36			9		1				
9.	76	9	4	23	3	7	11	1	1			30	2
10.	23	1	13	1	5	5	1	3				90	2
11.	83	14	11	40		4	2	3					
12.	96	23		26	5	3	6	1	1			45	2
13.	46	2		2	3	4	6		2			150	4
14.	62			6	3	1	10	1	1			90	4
15.	36	1		8	1	1	9	2	1			180	3
16.	101	15	7	30	4	1	16		1				
17.	104	17	1	35		1	16	1	1				
18.	49	3		8	4	1		2	3			165	3
19.	79	7	3	15	8	1	22					30	2

TABLE LXXXIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR LT-RS-COL-4-R

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	83	10	7	20	1	2	17	2		1	3		
2.	41	3			1	4	6			1	1	240	1
3.	22			4		1	4			1	4	240	1
4.	65	14	3	9	2	3	14	2		1	1	120	1
5.	6						1			1	1	285	1
6.	24			5	1	4	4			1	1	255	1
7.	3					5	1			1	1	290	1
8.	3			1	1	3	2					300	1
9.	2					3	1					290	1
10.	18			3	1		7					225	1
11.	23			2		3	2	1				285	2
12.	46			3	4	3	8					165	3
13.	85	7	2	12	5	3	21	1	1			75	2
14.	76	10	4	16	3	8	8	2				60	3
15.	33			4	2		7		1			225	4
16.	105	4		22	5	7	18					45	3
17.	60			12	1	3	13	2				105	3
18.	2						1		1			300	1
19.	23	2		3	1	3	4					240	1

TABLE LXXXIV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR LT-RS-COL-4-L

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	79	21	7	38	2		4	1	1			40	1
2.	29	3	2			2	6	1				240	3
3.	89	7	3	37		9	4		1			30	1
4.	60	28	14	52		2		1					
5.	104	10	5	54			5	2					
6.	81	25	21	41			1	1					
7.	100	20	15	32		5	1		1				
8.	115	5	7	14	1	7	10		1				
9.	129	13	2	32	2	2	7						
10.	94	16	9	21	5	1	10	3	1				

TABLE LXXXV

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR LT-RS-I-501

Trial	Variables OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	142	15	7	28	3	5	19	1	1				
2.	91	13	4	12	3	4	17	2		1	1	40	1
3.	17			2		4	1	1		1	1	225	1
4.	86	18	5	19	3	6	9	2	1	1	1	70	1
5.	78	12	2	21		6	8	2					
6.	43	1		7	5	9	5	3				150	2
7.	41			10	3	9	3	1		1	5	170	1
8.	81	12	3	14	1	10	2			1	3	105	1
9.	72	4	3	12	1	3	14			1	2	60	1
10.	71	20	7	14	1	2	7	1	1			60	1
11.	10			3		4	1	2				225	2
12.	172	22	8	52		1	8			1	1		
13.	82	15	6	28	1	3	13			1	3	45	1
14.	41	4	2	9	2	1	7					205	2
15.	34	2		13		3	4	2				120	2
16.	7			2	2	5	2					285	1
17.	20	2		2	1		7					255	3
18.	20	2		1	3		2			1	1	270	2
19.	68	9	1	23	2	5	15					75	1

TABLE LXXXVI

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR LT-RS-I-502

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	151	7		28	4	2	25						
2.	83			10	1	8	14					40	1
3.	79			6	1	2	18	1				70	3
4.	164	11	5	13	3	2	35		1				
5.	125	17	4	15	2	2	25	1				15	1
6.	126	11	8	10	3	12	17						
7.	124	14	4	23	1	11	14		1				
8.	130	10	4	41	1	5	10		1			30	1
9.	148	7	2	29	2		34						
10.	60	3		7	3		11	1				180	1
11.	65	2		15	2	4	9					90	1
12.	143	22	10	34	4	1	21						
13.	135	32	14	44	1	1	14		1				
14.	98	4	1	11	3	1	22	1	1			75	4
15.	62	4	2	13	1	1	9	1	2			100	5
16.	104	6	2	16	5	4	17					90	2
17.	109	8		9	1		27					110	1
18.	42	3		5	1		16					195	1
19.	45	4		6		1	16		1			165	1

TABLE LXXXVII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR RB-LT-I-503

	Variables												
Trial	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	228	38	16	44	3		1		1	1	1		
2.	131	12	1	54					1	1	2		
3.	118	6	1	46	8		2						
4.	160	6	3	35	8	5	12						
5.	135	13	5	28	2		5	3		1	2		
6.	140	13	4	39	2	8	2	2	1				
7.	130	16	5	34	2	5	5	3					
8.	105	9	3	32	3	8	4	1				90	1
9.	133	28	6	17	1	6	4	3				120	1
10.	22			7	2	3	4			1	5	165	2
11.	109	6	2	17	6	9	2					60	1
12.	164	16	6	43	9	1	3						
13.	170	19	1	30	5	1	6						
14.	151	21	9	20	5		17			1	5		
15.	156	19		36	2		8			1	2		
16.	148	6		33	8		10						
17.	259	19	4	32	2	1	24		1				
18.	277	12	6	50	5		10		1	1	1		
19.	176	11	8	35	8		18		1				

TABLE LXXXVIII

NUMBER OF RESPONSES PER VARIABLE ON EACH OPEN FIELD TRIAL FOR LT-RS-I-504

Trial	Variables												
	OG	MG	IG	FR	PR	HB'	HB-	W	S	D	NB	I	FI
1.	150	13	2	23	10	4	19			1	11		
2.	61	4	2	14		3	10	2		1	2	40	1
3.	37			3	2	4	5	1		1	2	255	2
4.	22			1	1	5	4			1	2	270	1
5.	10			4	3	1	1	1		1	2	285	1
6.	79	8	2	11	3	5	6			1	1	110	1
7.	124	19	2	25	2	11	6	1					
8.	14	4	2	1	1	3	4			1	1	240	1
9.	8				3	2	2					285	1
10.	8					1	3					290	1
11.	6						1					285	1
12.	112	15	3	29	14	1	1						
13.	126	7	4	14	1	2	19		1			15	1
14.	160	13	2	29	6	4	17						
15.	140	3	1	24	8	1	21						
16.	18			3	4	1	9					225	2
17.	29	1			1	2	7					225	2
18.	42	4		6			9					180	3
19.	66	2	3	8		2	14					135	7

TABLE LXXXIX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-COL-1-N

Trial	ET	Variables									
		TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:27.5	2:13.4	2		1	4		x	2	
2.		:34.2	:55.9	1			3			2	
3.		:06.0	:53.1	2			3			2	
4.		:27.1	2:03.2	2			5				
5.	x	1:21.0	1:55.6				1	1			
6.	x	:03.0	:31.0				1				
7.	x	:04.8	:19.4				1				
8.	x	:03.5	:14.4							1	
9.	x	:01.1	:15.6								
10.	x	:02.2	:11.6								
11.	x	:05.2	:12.7							1	
12.		:03.0	:15.2	1						1	
13.		:06.2	:15.3		1		1				
14.	x	:02.9	:11.4								
15.	x	:03.8	:13.3								
16.	x	:02.0	:10.3								
17.	x	:04.4	:15.0							1	
18.	x	:04.6	:29.7				1			1	
19.	x	:01.8	:12.1							2	
20.	x	:02.2	:10.8								

TABLE XC

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-COL-1-R

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:25.1	2:29.3	2	2		4			2	
2.		:11.9	3:54.0	4	3		5			1	
3.		1:54.0	20:00.0		5		1				x
4.		:27.0	2:02.7	2			4				
5.	x	:08.0	:49.8				1				
6.		1:20.9	1:55.2				1	1			
7.		:06.8	:39.1	1			1				
8.		:02.7	:23.2	1			3				
9.	x	:04.0	:18.8				1				
10.		:06.8	:27.6	1						1	
11.	x	:01.2	:22.5								
12.	x	:05.9	:25.2				2				
13.	x	:06.8	:25.1								
14.		:05.6	:18.9	1			2				
15.	x	:03.6	:12.8							1	
16.	x	:02.0	:11.8							1	
17.	x	:09.4	:33.1				1				
18.	x	:06.2	:14.6								
19.	x	:01.6	:14.9				2			1	
20.	x	:03.2	:35.4								

TABLE XCI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-COL-1-L

Trial	ET	Variables									
		TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:39.1	20:00.0	4	7	3	9				x
2.		4:05.0	16:46.4	5	5	2	8	3			
3.		:10.1	1:40.1	1	2		4				
4.		11:02.4	20:00.0	1	2		6				x
5.		3:39.4	8:22.0	3	2	1	1	3		1	
6.		5:07.1	6:53.0	2			2				
7.		:49.6	1:21.0	1			1			1	
8.	x	:13.8	:30.8				1				
9.		:28.8	1:31.3		1		1				
10.	x	:22.4	:59.6				3				
11.		:09.6	:22.2		1						
12.	x	:04.9	:17.4								
13.	x	:26.8	:47.6				2				
14.	x	:02.9	:11.4								
15.	x	:03.8	:13.3								
16.	x	:02.0	:10.3								
17.	x	:42.6	1:03.9				2				
18.	x	:03.8	:11.3								
19.	x	:01.6	:11.1								
20.	x	:01.2	:08.8								

TABLE XCII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-COL-2-N

Trial	ET	Variables									
		TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:36.9	3:50.9	4			5				
2.		1:04.5	1:24.2	2			2			1	
3.		:26.2	1:28.7		1		1				
4.		:19.1	:45.3	1			1				
5.	x	:08.6	:43.6				1			1	
6.	x	:11.3	:27.0				1				
7.		:08.5	:20.1	1			1				
8.	x	:04.0	:13.2								
9.	x	:11.7	:26.2				1			1	
10.	x	:05.1	:15.6							1	
11.		:02.9	:16.1	1			2				
12.	x	:03.9	:11.9								
13.	x	:02.8	:16.6								
14.	x	:01.4	:10.8							1	
15.	x	:05.2	:13.4								
16.	x	:02.0	:13.4								
17.	x	:04.9	:13.1							1	
18.	x	:03.4	:12.6							1	
19.	x	:04.2	:17.9				2				
20.	x	:03.8	:12.2								

TABLE XCIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-COL-2-B

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:10.0	2:23.4	4	2	1	2				
2.		:25.3	2:58.8	5	1		4				
3.		:27.6	:59.0		1		1				
4.		:09.7	1:42.1	1	1	1	1				
5.		:10.4	:36.2		1		1				
6.		:09.7	:50.6		1		1				
7.	x	:08.3	:19.8								
8.	x	:07.5	:19.1								
9.		:11.3	:24.7	2			2				
10.	x	:06.2	:14.7								
11.	x	:05.2	:15.3								
12.	x	:04.6	:26.6								
13.	x	:03.8	:17.4								
14.	x	:04.1	:15.8			1	1				
15.		:08.2	:31.1		1		2				
16.		:11.8	:27.5	1			1				
17.	x	:05.2	:31.9								
18.	x	:03.2	:12.6								
19.	x	:05.6	:16.8				1				
20.	x	:04.0	:13.9				1				

TABLE XCIV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-COL-2-R

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:06.1	2:16.2	1			3			2	
2.		1:34.4	4:59.4	4	6		5				
3.		:39.3	1:20.7	1	1		2				
4.		:09.0	1:11.4	2			4				
5.		:30.2	1:36.5		1		2				
6.	x	:06.9	:35.3								
7.		:14.5	:94.1		1		1				
8.		:08.6	:56.0	1			1				
9.		:03.2	:16.7		1		2				
10.	x	:13.3	:31.2				1				
11.	x	:07.1	:20.9				1				
12.	x	:03.6	:30.0							1	
13.	x	:03.7	:18.7							1	
14.	x	:08.2	:35.8				1				
15.		:05.0	:14.4							1	
16.	x	:04.6	:16.3								
17.	x	:08.2	:20.7				1				
18.	x	:04.2	:13.4							1	
19.	x	:07.4	:16.9				1				
20.	x	:02.4	:11.1								

TABLE XCV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-COL-2-L

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		2:22.7	8:44.2	5	4	1	5				
2.		1:11.3	3:12.1	1	2		6				
3.		:26.2	:56.1		2		1				
4.		:57.5	1:26.8	1	1		2				
5.		:10.1	2:02.6	2	1		4			1	
6.	x	:21.0	:37.4				1				
7.		:09.4	:45.0		1		1				
8.	x	:07.0	:17.1								
9.	x	:09.6	:44.6				1				
10.	x	:01.8	:11.1								
11.	x	:03.2	:16.9								
12.	x	:04.8	:13.8								
13.		:02.4	:14.5	1			1				
14.	x	:03.8	:13.2								
15.	x	:02.6	:11.7				1				
16.	x	:02.9	:11.1								
17.	x	:10.2	:23.5				1				
18.	x	:04.2	:11.9								
19.	x	:10.8	:30.0				1				
20.	x	:03.9	:11.8								

TABLE XCVI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-AR-COL-3-N

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		8:37.6	10:19.4	2	1		10			5	
2.		:30.9	3:15.7	2	2		14			4	
3.		:52.1	1:30.4		1		5			1	
4.	x	:20.7	:51.7				5				
5.		:19.3	:44.5	1			5				
6.		1:21.5	3:52.4		1		5			1	
7.	x	:06.8	:29.6				2				
8.		:43.6	:58.5		1		4				
9.	x	:10.8	:30.0				4				
10.	x	:06.7	:16.7				2				
11.		:06.9	:22.4	1			2			1	
12.		:06.2	:27.7	1			1				
13.	x	:13.3	:24.7				1				
14.		:06.5	:21.1	1							
15.	x	:07.1	:13.2								
16.	x	:04.0	:09.3								
17.	x	:06.9	:11.1								
18.	x	:03.9	:09.9								
19.	x	:01.5	:06.9								
20.	x	:01.7	:07.6								

TABLE XCVII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-AR-COL-3-B

Trial	ET	Variables									
		TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:30.6	2:44.9	1	3		10			1	
2.		:23.2	:55.6	1			3				
3.	x	:03.4	:29.8				3				
4.		:03.2	:31.4	2			2				
5.		:19.2	20:00.0	6	12	2	33	3		2	
6.		:25.3	8:11.4	1	5	2	13	4			
7.		:21.6	1:02.6	1			3				
8.		:09.7	:57.6	1	1		3				
9.		:08.1	:36.6	1			4				
10.		:10.3	:40.3	1			4				
11.		:09.3	:36.2	1		2	1				
12.		:05.9	:37.3	2							
13.		:12.8	:46.8	2			3				
14.	x	:08.1	:21.2				1				
15.		:12.4	:34.1	1			1				
16.	x	:07.6	:25.4								
17.	x	:07.4	:21.1								
18.	x	:10.1	:21.3				1			1	
19.		:17.5	:58.4	2	1		3				
20.	x	:07.0	:18.2			1					

TABLE XCVIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-AR-COL-3-R

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:17.8	5:21.5	6	4		17	1		1	
2.		:38.4	1:16.8	1			2	1			
3.		:26.8	3:37.3		2		10	1			
4.		4:06.9	5:52.2	1	3		9	2			
5.		:33.6	7:58.4	2	4		20	1			
6.	x	:54.8	1:36.1				3				
7.	x	:24.1	1:01.7			1	3				
8.	x	:13.2	:32.1				3				
9.		:14.8	:47.4	1		1	5				
10.		:19.2	:45.4	1			4				
11.		:07.1	:34.7	1			3				
12.	x	:02.6	:15.3				2				
13.	x	:06.1	:12.6				3				
14.		:10.6	:31.4	1							
15.		:07.9	:26.0	1							
16.		:11.3	:38.9		1		2				
17.	x	:04.7	:14.0								
18.	x	:03.6	:21.6				3				
19.	x	:10.8	:17.9								
20.	x	:10.1	:19.7				1				

TABLE XCIX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-AR-COL-3-L

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:42.6	20:00.0		1		4				x
2.		2:56.1	4:06.8	1	1	1	10	1			
3.		1:12.4	2:35.8		1		6	1			x
4.		:39.9	1:35.8		1		4				
5.	x	:46.3	1:44.9				5				
6.		:45.2	1:36.7	2		2	6				
7.		:20.5	:59.9	1	1		6				
8.	x	:11.9	:24.1				3				
9.	x	:13.2	:31.7				4				
10.	x	:07.8	:11.3				1				
11.	x	:07.1	:16.4				1				
12.		:15.2	:58.9	2			3			1	
13.	x	1:01.7	1:44.5				3				
14.	x	:11.2	:19.6								
15.	x	:27.0	:38.5								
16.	x	:07.9	:17.6				1				
17.	x	:10.0	:20.1								
18.	x	:13.7	:21.5								
19.		:09.2	:29.4								
20.	x	:09.1	:22.1				1				

TABLE C

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-ISO-4-H

Trial	ET	Variables									
		TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:20.0	5:40.1	4	5	1				2	
2.		:03.6	3:01.2	2	2						
3.		:36.2	3:04.1	2	3	1					
4.		:53.1	1:31.4	1							
5.	x	:40.2	:41.7								
6.		:04.8	:23.7	1							
7.	x	:03.4	:08.4							1	
8.	x	:03.4	:12.0							1	
9.	x	:10.6	:25.6								
10.	x	:11.1	:27.2				1				
11.	x	:02.6	:15.1				1				
12.	x	:04.0	:15.8								
13.	x	:05.2	:21.0							1	
14.	x	:09.4	:19.0				1				
15.	x	:09.8	:15.4								
16.	x	:02.8	:14.6								
17.	x	:00.8	:07.8								
18.	x	:11.2	:16.8								
19.	x	:00.6	:08.2								
20.	x	:03.0	:11.0								

TABLE CI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-ISO-34-H

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:27.0	2:54.2	3	1					1	x
2.		:09.2	6:07.0	6	2		2			4	
3.		:15.4	3:29.1	1	3					2	
4.		:09.4	2:33.0	1			3			1	
5.		:32.4	8:53.9	1	3		3	1			
6.		:06.8	15:10.0	6	9	1	1	1		2	
7.		:05.8	4:55.7		3		1	2			
8.	x	:03.4	3:31.1								
9.		:11.8	3:53.3	1	1		3	1		2	
10.		:47.6	1:23.4		1		2			2	
11.	x	:07.8	:49.2				1				
12.	x	:27.2	:47.6				1				
13.	x	:33.0	1:10.8				4			1	
14.		:27.0	:42.8		1		1				
15.	x	:55.4	1:11.2				1				
16.	x	:09.2	:23.0				1				
17.	x	:06.4	:19.9								
18.	x	:09.2	:20.6								
19.	x	:16.2	:26.2								
20.	x	:28.8	:40.8				1				

TABLE CII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-ISO-100

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:19.2	7:15.4	10	5					8	
2.		:08.0	4:37.2	5	6					1	
3.		:15.8	2:07.9	3							
4.		:08.3	1:29.4	1	1					1	
5.	x	:10.4	1:11.7				3				
6.	x	:04.9	:47.6				2				
7.		:22.9	1:14.6				2				
8.		:06.4	:29.3	1			1				
9.	x	:10.8	:38.2				2				
10.	x	:17.1	:47.9				3				
11.	x	:06.1	:21.6				1				
12.	x	:14.4	:26.7				1				
13.	x	:10.1	:28.0				1				
14.	x	:13.8	:26.3				1			1	
15.	x	:32.6	:41.8				3				
16.	x	:07.2	:19.0								
17.	x	:05.8	:14.6				1				
18.	x	:08.0	:20.0				3				
19.	x	:04.8	:20.7				1			1	
20.	x	:10.8	:21.6				1				

TABLE CIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-ISO-101

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:09.6	1:58.1	3			1			5	
2.		:27.1	4:57.0	3	6					4	
3.		:09.3	1:15.6	1	2					3	
4.		:10.3	1:10.5	2	1					1	
5.		:15.3	1:04.0	1							
6.		:03.4	:46.0	2							
7.		:03.6	1:15.0	3			2			1	
8.		:17.6	:43.1	1			1				
9.		:15.9	2:04.9	1	3		2				
10.		:20.6	1:09.0	4			4				
11.	x	:07.9	:34.4				2				
12.	x	:03.9	:20.6				2				
13.	x	:16.1	:35.0				1				
14.	x	:04.2	:47.0				2			1	
15.	x	:03.8	:42.7				2				
16.	x	:01.8	:16.4								
17.	x	:00.8	:16.0								
18.	x	:10.4	:22.1				2				
19.	x	:06.0	:15.4				1				
20.	x	:00.8	:10.2								

TABLE CIV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-AR-ISO-301

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		20:00.0	20:00.0		2	4	4	2		6	x
2.		20:00.0	20:00.0		2		6	1		1	x
3.		15:00.0	15:00.0		1		3				x
4.		15:00.0	15:00.0		1		3				x
5.		10:00.0	10:00.0				1				x
6.		10:00.0	10:00.0				1				x
7.		5:00.0	5:00.0				1				x
8.		5:00.0	5:00.0								x

TABLE CV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-AR-ISO-302

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:11.8	2:22.8	2	1		9			6	x
2.		:05.3	1:58.7	4			7			1	
3.		:07.9	:59.4	2			4			1	
4.		:31.2	1:16.2	2			1			2	
5.	x	:21.5	1:24.3				5				
6.	x	:10.8	:33.6				4				
7.	x	:06.8	:27.9				1				
8.		:08.9	:30.0	1			1			1	
9.	x	1:16.2	2:17.8				3			1	
10.	x	:10.5	:36.3							1	
11.		:04.6	:43.5	1			1				
12.	x	:02.6	:16.9								
13.	x	:03.4	:15.1								
14.		:05.7	:20.2				1				
15.	x	:02.9	:12.6								
16.	x	:07.7	:23.7				1			1	
17.		:07.2	1:00.0	1			4			1	
18.	x	:03.4	:12.1								
19.	x	:07.0	:16.6				1				
20.	x	:13.7	:25.2								

TABLE CVI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-AR-ISO-303

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:30.1	9:23.4	2	4	2	14			5	x
2.		:17.4	5:17.2	3	1	2	11			2	x
3.		:06.6	:49.6	1	1	1	9			2	x
4.		:06.0	:29.9		2		7			1	x
5.		3:51.7	20:00.0	2	1		17	2			x
6.		1:22.4	6:15.6	1			6	1			x
7.		1:45.3	3:13.2		2		9				x
8.		1:17.1	2:46.8		1		1				
9.		2:36.3	3:17.2	1		1	3				x
10.	x	1:49.1	2:42.1				4				x
11.	x	:56.8	1:19.7				6				x
12.	x	:47.4	:59.2				1				
13.		1:54.3	2:21.6		1		4				x
14.		1:11.1	1:33.2	1			3				
15.	x	:27.4	:54.1				2				
16.	x	:09.2	:35.9				2				
17.	x	:12.6	1:01.0				1				
18.	x	:09.5	:20.6								
19.	x	:14.3	:37.1				1				
20.	x	:09.9	:18.0				1				

TABLE CVII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-AR-ISO-304

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:19.6	20:00.0	2	3		8	2		6	x
2.		20:00.0	20:00.0		1		2	2			x
3.		1:06.3	3:06.5	1	1		8				
4.		:06.5	:31.5	1			2			1	
5.		:15:00.0	15:00.0		1		3			1	x
6.		15:00.0	15:00.0				1				x
7.		10:00.0	10:00.0				1				x
8.		:41.6	1:08.9	1			5				
9.		:09.2	10:00.0		1		5				x
10.		6:00.0	6:00.0				2				x

TABLE CVIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-SP-R

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:41.0	6:00.1	4	2		10			1	
2.		:49.2	1:55.0	1			5				
3.		:08.9	1:58.3		1		3				
4.	x	:24.1	:51.6				1				
5.	x	:16.0	:29.5				1				
6.		:15.8	:55.5	1			4				
7.		:10.8	1:26.1	2	1	1	6				
8.		:18.6	1:05.1	1	1		3				
9.	x	:08.3	:31.0				1				
10.		:08.6	:37.7	1			3			1	
11.	x	:04.6	:17.5				1				
12.	x	:04.4	:18.3				3				
13.	x	:06.3	:27.8				1				
14.	x	:16.2	:32.7				2				
15.	x	:08.1	:26.3				3				
16.	x	:04.6	:19.4				1				
17.	x	:02.8	:16.8								
18.	x	:11.2	:31.6				3				
19.	x	:09.2	:20.6				1				
20.	x	:09.4	:20.4				1				

TABLE CIX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-AR-SP-L

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:31.0	3:56.0	1		1	5			2	
2.		1:38.0	20:00.0	1	1	1			x	1	x
3.		20:00.0	20:00.0				1				x
4.		9:31.0	10:10.0	3			5				x
5.		:43.0	2:08.0	2	1		6		x		
6.		:50.4	2:47.9	1	1		2				
7.		2:59.6	6:26.4	1			2			2	
8.		:52.7	2:02.2	1			2			2	
9.		:52.7	20:00.0				1		x	1	x
10.		1:02.4	2:33.3		1		2				
11.		:33.2	1:13.7		1		1				
12.	x	:27.6	:51.7				1			1	
13.		:37.8	1:54.5		1		3				
14.	x	:36.2	:53.3				2				
15.	x	:09.8	:25.7								
16.	x	:05.4	:18.9								
17.	x	:07.8	:19.4				1				
18.	x	:08.2	:25.9				2				
19.		:08.4	:43.5	1			2				
20.	x	:04.8	:20.2				1			1	

TABLE CX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-COL-N

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:48.6	3:23.9	3	2		6			8	
2.		:39.6	5:43.7	2	5		14			3	
3.		1:58.9	2:20.7		1		4				
4.		:29.1	:49.9	1			4				
5.	x	:30.9	:51.0				2				
6.	x	:26.4	:43.4				3				
7.	x	:45.8	1:01.3				2				
8.		:40.2	2:55.9	1			2				
9.	x	3:25.9	3:44.0				4	1			
10.	x	1:00.4	1:14.7				4				
11.	x	:40.4	:51.8				3				
12.	x	:30.4	:37.1				1				
13.	x	:12.6	:23.3								
14.	x	:31.2	:44.6				1			1	
15.	x	:39.4	:49.0				1			1	
16.	x	:27.9	:34.6				1				
17.	x	1:31.6	1:49.3				1				
18.	x	1:44.2	1:52.3				2				
19.	x	:32.9	:36.8				1				
20.	x	:20.5	:28.5				1				

TABLE CXI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-COL-B

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:09.8	2:05.9	5	2		5			1	
2.		:33.6	1:55.8	2	1	1	5			1	
3.		1:02.3	2:56.8	2	2		5	2		1	
4.		:24.1	:41.8	1			3			1	
5.		:10.6	1:45.6		1		9			1	
6.	x	:29.1	:40.6				3				
7.		:22.8	:35.5				3				
8.	x	:41.0	:46.5				2				
9.	x	:26.8	:43.3				2			1	
10.	x	:50.6	:58.1				2			1	
11.	x	:49.6	:55.5				2			1	
12.	x	:40.6	:53.4				2			1	
13.	x	:09.2	:49.4				1				
14.	x	:41.4	:56.4				1				
15.		:09.2	:26.4	1			2				
16.	x	:06.2	:14.9				1				
17.	x	:45.8	:50.4				1				
18.	x	:18.9	:26.9				2				
19.	x	:01.7	:10.1								
20.	x	:05.4	:12.2								

TABLE CXII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-COL-R

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:49.5	6:54.6	8	4		5	1		2	
2.		1:28.9	4:09.8	6	4		10			4	
3.		:44.6	6:49.4	3	5		15	2		3	
4.		:47.3	1:19.7	1	1		5				
5.		1:08.6	1:54.3	1	2		4			1	
6.		:16.7	8:43.9	1	4		10			2	
7.		18:30.0	20:00.0		4		9	1		2	x
8.	x	1:07.5	1:27.5				6			1	
9.		:28.1	1:41.0	2	1		8				
10.		:48.6	1:50.8	1	2		8				
11.	x	:52.1	1:06.0				4				
12.		:38.6	1:02.2	1			5			2	
13.		:20.2	1:21.3	2	2		3				
14.	x	:26.4	:48.3				3				
15.	x	:22.7	:35.9				3				
16.		:38.9	:54.5		1		3				
17.	x	:30.6	:38.4				1			1	
18.		4:21.2	4:32.8		3		10	1			
19.	x	:45.6	:54.5				2				
20.	x	:35.7	:47.5				3				

TABLE CXIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-COL-1

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:18.6	1:22.8	5			2			3	
2.		:14.2	1:39.5	1	1		6	1	x		
3.		1:12.4	2:29.5	3	2		6			6	
4.		:16.9	2:00.7	5	2		7			1	
5.		:35.8	3:35.2		2		3				
6.		:11.2	:26.4	1			1				
7.	x	:07.2	:33.1				3			1	
8.		:32.1	:58.6		1		7			1	
9.		1:07.9	4:20.7	2	2		9				
10.		:47.4	1:05.6	1			3				
11.	x	:17.2	:45.2				5				
12.		:23.1	1:00.5	2			5				
13.	x	:05.8	:30.5				4			1	
14.		:28.4	:44.4		1		3			1	
15.		:48.1	1:00.5	1	1		5				
16.	x	:08.4	:13.4				1			1	
17.	x	:44.2	:55.3				3			1	
18.		1:04.6	1:19.9	1			3			1	
19.	x	:25.7	:34.4				3				
20.		:28.4	:34.3	1			2				

TABLE CXIV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-COL-2-N

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:47.8	1:45.1	3			5	1		2	x
2.		:51.9	1:57.7	1	1		6				
3.	x	:21.3	:56.5				2				
4.	x	:22.6	:42.5				2				
5.		:57.4	2:55.0	2	2		4	1		2	x
6.		:34.8	2:59.6	4	2		4	1		2	
7.		:05.3	6:13.0	1			2	1		1	x
8.		20:00.0	20:00.0								x
9.		9:41.8	20:00.0		1	1	5	2		1	x
10.	x	4:51.9	5:15.6				4	1			
11.	x	:44.6	1:01.5				4				
12.		:21.8	:26.9	1			2				
13.		:35.4	:52.1	1			1				
14.		:24.9	2:05.9		1		2				x
15.		1:03.8	2:02.5	1	1		5	1			
16.		7:29.3	11:47.4	2	3	2	14			2	
17.	x	4:29.1	4:42.0			4	1	1			
18.	x	:30.4	:46.5				2				
19.	x	:28.3	:46.5				1				
20.	x	:16.4	:27.8								

TABLE CXV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-COL-2-B

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		9:21.5	20:00.0	1	2		8	2	x	7	x
2.		20:00.0	20:00.0				1	2			x
3.		5:03.6	6:44.9	4	1		11	1		2	
4.		10:08.0	15:00.0		2		8	1			x
5.		15:00.0	15:00.0				2	1			x
6.		1:13.3	10:00.0				4				x
7.		10:00.0	10:00.0								x
8.		2:36.2	5:00.0		1				x		x

TABLE CXVI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-COL-2-R

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:09.9	20:00.0	3	5	1	12	4	x	7	x
2.		20:00.0	20:00.0		1	1	4	1		1	x
3.		:42.1	1:11.2		1		5				
4.		15:00.0	15:00.0	1	1		4			1	x
5.		10:09.4	13:15.8	4	3		14	1		1	x
6.		:59.4	10:00.0	1	2		6	1			x
7.		10:00.0	10:00.0	1	1		3	1	x		x
8.		5:00.0	5:00.0				1	1			x
9.		6:00.0	6:00.0	1			3	1			x

TABLE CXVII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-COL-2-L

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:51.3	2:49.9	1	1		7			3	
2.		10:44.4	13:09.6	4	1	1	5	1	x		
3.		:13.6	:55.9	2			4				
4.		:19.7	11:23.2		1		6				
5.		1:25.3	1:55.2	1	2		8				
6.		:05.9	3:04.4	5	1		4				
7.	x	:34.2	:54.6				4				
8.		:16.2	:41.6	1			1			1	
9.		:25.7	1:35.9		1		6				
10.		:08.0	:27.0	1			2				
11.		:05.2	:27.1	1			2				
12.		:28.0	:45.9	1	1		3				
13.		:17.1	1:03.8	1							
14.		:08.7	:42.4	2	1		2				
15.		:07.2	:42.4	2	1		2				
16.	x	:08.4	:18.8								
17.	x	:02.1	:17.5				1				
18.	x	:05.1	:17.3				1				
19.	x	:05.4	:13.1								
20.		:02.1	:20.7	1			1				

TABLE CXVIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-COL-3-N

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		2:01.8	2:03.7	3		2	6			8	x
2.		1:37.4	20:00.0	3	7	18	14	2	x	2	x
3.		20:00.0	20:00.0		2	3	6			1	x
4.		15:00.0	15:00.0		2			1			
5.		15:00.0	15:00.0				2				x
6.		10:00.0	10:00.0		1						x
7.		10:00.0	10:00.0								x
8.		5:00.0	5:00.0								x
9.		5:00.0	5:00.0								x

TABLE CXIX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-COL-3-N

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		20:00.0	20:00.0			3		2	x	5	x
2.		7:48.1	9:39.6	3	1		7				
3.		1:42.5	5:12.1	4	1		7	1		1	x
4.		:32.4	8:57.8	4	2		9	1		8	x
5.		1:41.3	7:36.4		1		11				
6.	x	:28.2	1:06.6				2				
7.	x	:53.1	1:32.9				3				
8.		:29.4	1:11.5	1			4				
9.		1:54.5	4:16.29		3		6	2		1	
10.	x	9:02.0	9:43.8				2	1			
11.	x	6:15.4	6:41.5				1				
12.		1:15.2	2:02.8	1			3				
13.	x	7:25.1	8:01.8				2	2			x
14.		20:00.0	20:00.0								

TABLE CXX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-COL-3-R

Trial	ET	Variables									
		TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:20.9	8:15.6	7	3	4	16	4		3	x
2.	x	:13.5	:36.4				3				
3.		:15.1	1:27.3		1	1	7				
4.		:10.2	1:37.0		1		5	2			
5.	x	:45.0	1:41.1				4				
6.	x	:13.3	:41.5				2				
7.	x	:09.2	:39.4				2				
8.	x	:09.4	:27.7								
9.	x	:06.5	:17.5								
10.	x	:04.6	:50.2								
11.	x	:05.3	:21.0				1				
12.	x	:04.8	:17.7							1	
13.	x	:09.8	:27.5				1				
14.	x	:04.1	:17.4								
15.		:09.6	:18.0	1			1				
16.	x	:10.9	:29.7				2				
17.	x	:05.2	:14.9								
18.	x	:01.6	:12.5								
19.	x	:03.2	:11.4								
20.		:04.3	:47.4	1	1		1				

TABLE CXXI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-COL-3-L

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		20:00.0	20:00.0		4	14	5	2		6	x
2.		8:24.3	9:05.3	1		10	7	2		3	x
3.		:30.4	1:44.6	5			5			1	x
4.		:45.6	2:46.5	4	3	5	6			1	
5.		:41.3	4:47.1		3		6			3	x
6.		:35.4	4:11.6	3	1		6			1	x
7.		:54.7	4:51.5	2				1		10	x
8.		:53.7	2:16.7	1			5	1		1	x
9.		:27.3	1:19.5		1		5	2		2	x
10.		:19.5	2:05.6	1			4			7	x
11.		:25.3	1:20.9	2			3			2	x
12.		:43.7	1:40.5	1			2			3	x
13.	x	:56.3	1:29.0							2	x
14.	x	:22.3	1:07.5				1			3	x
15.		:41.7	1:00.6	1						4	x
16.		1:10.1	2:21.5	3		1	1			2	x
17.		:37.2	1:29.0	2			2			2	x
18.	x	:21.9	1:35.5							4	
19.	x	:31.6	:44.6								
20.		:51.2	1:04.8	1		1				1	

TABLE CXXII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-ISO-9-H

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		3:20.4	9:18.1	3	3		4		x	13	
2.		:17.3	:54.4	1	1		1			1	
3.		:09.6	2:25.7		2		2			1	
4.	x	:08.6	:34.2							1	
5.		:21.6	2:37.6		1		3				
6.		:10.0	1:41.2	1			3			1	
7.	x	:05.8	:40.8				5				
8.		:14.8	:40.5	1			3				
9.	x	:06.8	:23.5				2				
10.	x	:05.6	:17.9				1				
11.	x	:04.8	:46.6				1				
12.		:51.8	3:59.8		1		6	1		3	
13.	x	:39.4	:43.1		1		1				
14.	x	:01.8	:17.0				2				
15.	x	:03.4	:17.0				3				
16.	x	:03.6	:17.6							1	
17.	x	:01.8	:20.9				1				
18.	x	:06.8	:22.1				2				
19.	x	:01.4	:17.8				2				
20.	x	:01.6	:12.5				1				

TABLE CXXIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-ISO-20-H

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:24.1	1:54.1	2	2		1			8	
2.		:11.2	2:00.0	3	2		2			3	
3.		:08.9	1:26.3	2	1		2			2	
4.	x	:08.1	:25.2				2			1	
5.		:24.5	9:08.5	3	6		5		x		
6.		:42.4	20:00.0		3		4		x		
7.		20:00.0	20:00.0		2		3				
8.		8:49.6	9:00.3		3		6		x	2	
9.	x	:54.3	1:14.0				5			2	
10.	x	:42.8	:57.7				4				
11.		1:15.3	1:33.8		1		5			1	
12.		1:48.5	1:57.4		1		3				
13.		3:54.6	4:10.9		2		4				
14.	x	:12.8	:50.4				4				
15.	x	1:27.8	1:37.2				2	1		1	
16.	x	:28.6	:38.2				1				
17.		2:03.4	2:10.5				2	1			
18.	x	10:06.3	11:23.2				1				
19.	x	8:06.9	8:29.0				2				
20.	x	:29.6	:44.4								

TABLE CXXIV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-ISO-201

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:33.8	20:00.0	6	11		7		x	13	
2.		:44.8	20:00.0	2	4		2		x	3	
3.		15:00.0	15:00.0								
4.		15:00.0	15:00.0								
5.		10:00.0	10:00.0								
6.		10:00.0	10:00.0				2				
7.		5:00.0	5:00.0								
8.		5:00.0	5:00.0						x		

TABLE CXXV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-ISO-204

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:09.1	3:20.4	3	3		2			8	
2.		:07.8	2:15.7	4	3		1			3	
3.		:35.8	2:38.8	2	1		1			3	
4.		3:02.4	4:31.0	3	1		2			6	
5.	x	:09.0	:36.7				2				
6.		:15.8	:52.4	1			3			1	
7.		:14.9	2:01.4	1	3		4			2	
8.		:21.4	3:30.2	1	3		6				
9.	x	:32.2	:56.9				4				
10.		1:50.4	2:10.5		1		2	1			
11.		2:05.6	3:07.2	1	1		5		x	1	
12.		8:53.8	9:20.3		2		5			1	
13.		3:44.6	3:36.7		1		4			1	
14.		1:03.8	5:02.4	3	2		6			1	
15.		2:53.6	3:41.8	1			3				
16.		3:19.8	4:31.7		1		4	1		1	
17.	x	:08.3	:31.7				1				
18.	x	:29.6	:44.9				3				
19.	x	:15.5	:27.2				1				
20.		:11.2	1:16.8				5				

TABLE CXXVI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-ISO-206

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:36.4	3:58.4	3	1		2			6	
2.		:13.7	2:46.3	5	1		1			1	
3.		:06.6	2:35.0	2	2		1			1	
4.	x	:11.6	:55.7								
5.		:14.2	1:24.0	2			2				
6.		:12.9	:32.0	1			1			1	
7.		:03.8	:31.4	1							
8.	x	:13.1	:25.9							1	
9.	x	:10.4	:25.3								
10.		:17.5	:47.0	2							
11.	x	:02.4	:16.3				2			1	
12.	x	:20.2	:31.7				1				
13.	x	:20.4	:30.6				2				
14.		:05.6	:27.6	1			1				
15.	x	:02.8	:11.9				1				
16.	x	:11.6	:20.5								
17.		:13.8	:29.2	1			2				
18.	x	:11.8	:23.8				1			1	
19.	x	:08.1	:22.4				3				
20.	x	:20.4	:29.5				1				

TABLE CXXVII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-ISO-220

Trial	Variables ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:44.2	2:47.8				1			4	x
2.		1:25.6	5:53.7	5	2	3	2		x	3	x
3.		1:55.8	11:11.8	5	4	2	4	1		2	
4.		2:55.4	12:37.6	3	4	2	3		x	2	
5.		:24.6	3:07.3	1	1		2				
6.		1:02.2	3:13.6	1	1		3				
7.		1:17.9	8:17.0		1		4				
8.		:46.0	6:47.2		1		2	1			
9.		1:10.8	1:52.0		1		4			1	
10.	x	1:25.9	1:59.2				2				
11.		1:19.4	1:51.5	1			4	1		1	
12.	x	:47.2	1:01.4				2				
13.		2:00.5	2:16.6		1		2				
14.		:32.0	:55.1	1			2			1	
15.	x	1:05.6	1:33.6				3				
16.	x	1:11.6	1:31.7				2				
17.	x	1:07.8	1:51.7				5				
18.	x	1:02.8	1:20.7				4				
19.	x	:55.9	1:20.7				4				
20.		:53.6	1:06.8				4				

TABLE CXXVIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-ISO-401

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:13.1	4:16.5	4	2	1	10			9	x
2.		1:57.5	4:36.7	3	3		8			2	x
3.		:19.1	1:22.6	1			6				
4.		:33.4	2:06.7	1	1		9			1	
5.		1:54.7	5:09.2	2	3		8			1	
6.		1:06.1	8:19.7	3	2	9	10	1	x	1	
7.	x	:41.0	1:43.1				3				
8.		1:24.3	7:25.4		1		6	1			
9.		1:27.5	1:53.6				3			1	
10.		1:29.4	7:03.7	2	2		6	1			
11.		5:58.7	7:03.4	1			2				
12.	x	:27.7	2:35.9				3	2			
13.	x	3:10.0	4:01.0				1			1	
14.		:43.0	1:07.6	1				1		1	
15.	x	:53.4	1:37.3				1				
16.	x	:48.6	1:57.0				4				
17.	x	:49.5	1:48.0				5				
18.	x	:49.7	1:30.4				3				
19.	x	2:40.0	3:07.2				3				
20.	x	1:11.4	1:47.8				2				

TABLE CXXIX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-ISO-402

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:51.1	5:22.1	3	5		13			10	x
2.		:48.9	1:33.8	1			5			3	
3.		:37.6	2:44.7	1	1		6			2	
4.		1:10.5	2:26.5	1			7				
5.		3:19.4	6:10.1	1	1		5				
6.	x	2:37.3	2:13.2				6				
7.	x	7:46.4	8:23.5				2				
8.	x	1:36.4	2:08.8				2				
9.		4:56.2	11:21.9	3	1		8				
10.	x	8:11.6	9:16.9				1				
11.		:24.1	2:03.2		1		5			1	
12.	x	1:26.6	2:07.6				3				
13.		5:37.2	13:56.8		1		5	1		1	
14.	x	2:15.2	2:40.2				1				
15.	x	1:34.3	1:52.8				1				
16.	x	1:22.5	1:36.7								
17.	x	1:01.2	1:22.5				1				
18.	x	:37.3	:55.6								
19.	x	:32.7	1:01.7				1				
20.		:28.5	:51.9				2				

TABLE CXXX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-RS-ISO-403

Trial	ET	Variables									
		TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:56.4	2:16.9	3			6			7	x
2.		:23.8	3:12.7	4	2		9			2	x
3.		1:04.5	8:31.6	1	1		11	1		1	x
4.		:15.3	1:19.2	1		1	3				x
5.		:19.6	10:37.6	1			1	1			x
6.		:27.5	20:00.0				3		x	1	x
7.		1:31.4	18:19.7	5	3	3	19	1			
8.		1:36.1	20:00.0	1		1	7	1			x
9.		6:14.9	15:00.0	2			5				x
10.		10:00.0	10:00.0								x

TABLE CXXXI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-SP-R

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:11.4	3:09.9	4	2	1	1			3	x
2.		:04.1	1:45.5	4	1		6			1	x
3.		:27.8	3:48.6	2	4		1			2	
4.		1:31.7	2:50.5		2		1			1	
5.		:30.6	1:05.3		2		1			1	
6.		:08.4	1:10.3	2			2				
7.		:15.6	1:21.6	2	1		2				
8.	x	:29.8	:49.8				1				
9.	x	:12.4	:56.0								
10.		:12.2	1:14.3	3	1		2				
11.	x	:18.6	:57.3				1				
12.		:09.4	:49.3	1	1		2				
13.		:27.0	:35.7		1		2				
14.	x	:14.6	:34.2				2				
15.		:36.8	1:29.7	1	2		1				
16.		:22.8	:36.6	1			2				
17.	x	:52.8	1:03.9				2				
18.		2:09.8	4:24.2	1	2		7				
19.		:42.8	:57.3		1		3				
20.		:36.4	1:11.6	1			3				

TABLE CXXXII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-RS-SP-L

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:10.7	1:52.1		1		4			6	x
2.		:11.2	4:28.7	9	5	1	10			3	x
3.		:38.6	4:09.9	2	4		3			3	x
4.		:50.4	9:45.0	3	6		2			4	x
5.		:41.5	10:05.8	4	5		2		x	2	x
6.		:17.9	5:14.2	2	3		3				x
7.		:32.4	1:44.8		1		3			1	x
8.	x	:58.0	1:57.4				4				x
9.		1:01.3	2:14.3		1		1			1	x
10.		:39.0	5:10.0	1	3		9	1	x	2	x
11.		:13.8	6:21.4	2	5		11			3	x
12.		:54.8	3:01.8	1	2	1	6				x
13.		1:16.6	2:25.6		2		2				x
14.	x	:41.6	1:21.1				2		x		x
15.		:35.4	1:19.8	1			3				x
16.		:38.2	1:40.4				3			1	x
17.	x	3:13.8	3:45.7				3			1	x
18.	x	1:56.4	2:18.5				4				x
19.		2:06.4	8:16.2	1	3	1	5	1		1	x
20.		:43.9	3:34.8	2	3		5				x

TABLE CXXXIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR LT-COL-B

Trial	ET	Variables									
		TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:11.4	20:00.0	3	1	1	5	2		10	x
2.		20:00.0	20:00.0			2	2			3	x
3.		15:00.0	15:00.0					1			x
4.		15:00.0	15:00.0			1	1	1			x
5.		10:00.0	10:00.0								x
6.		10:00.0	10:00.0								x
7.		5:00.0	5:00.0								x
8.		5:00.0	5:00.0								x

TABLE CXXXIV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR LT-COL-N

Trial	Variables ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		2:27.2	4:18.7	4	4	1	11			8	
2.		:47.4	1:41.6	2	1		9				
3.		:04.9	:51.6	2			2			1	
4.		:38.3	1:17.4	1			7				
5.		1:11.5	8:38.5	1	2		10				x
6.		:43.1	3:52.4	3	1		10			1	x
7.		:26.4	2:46.0	1	2		11				
8.	x	1:15.8	1:52.8				7				
9.	x	1:48.0	2:38.5				4				
10.	x	:37.7	:53.5								
11.		:23.5	:39.3	1			1				
12.	x	:21.5	:33.6				1				
13.		20:00.0	20:00.0				1				x
14.		11:03.9	11:35.9		1		3	1			
15.		:26.4	:44.9	1							
16.	x	:07.1	:22.6								
17.	x	:17.3	:24.5								
18.	x	:05.5	:19.1								
19.	x	:10.3	:24.6				1				
20.	x	:07.8	:14.3								

TABLE CXXXV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR LT-COL-R

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		2:08.1	3:07.6	2	1	2	8		x	9	x
2.		4:40.5	6:15.0	2	3		14	1		2	
3.		1:34.6	8:41.6	1	3	5	11				
4.		:37.4	1:47.9	1			4			1	
5.		20:00.0	20:00.0			3	1	1			x
6.		1:24.5	20:00.0		2	1	9				x
7.		9:44.6	15:00.0		2	2	11				x
8.		15:00.0	15:00.0			1					x
9.	x	5:17.2	5:52.3			3	5				x
10.	x	:44.6	:53.7				2				
11.	x	:46.3	:59.9				2				
12.	x	:29.7	:37.0								
13.		7:00.0	7:00.0								x

TABLE CXXXVI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR LT-ISO-501

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:38.8	6:28.2	5	2		9		x	17	x
2.		:12.2	1:05.9	1			8			1	x
3.		:04.9	1:07.7	1	1		4			2	x
4.		:09.1	3:55.5	2	3		11			1	x
5.		2:13.0	20:00.0		2		3	2	x	2	x
6.		20:00.0	20:00.0		1		2			1	x
7.		9:03.1	10:34.1	2		1	5		x		
8.		15:00.0	15:00.0						x		x
9.		15:00.0	15:00.0						x		x
10.		4:21.3	6:24.9	2	1		12		x		
11.	x	:33.5	1:04.6				1				
12.		1:00.0	1:00.0				1				x

TABLE CXXXVII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR LT-ISO-502

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:40.9	3:03.4	2	1		8			15	
2.		:11.7	1:40.2	4			5			1	
3.		1:17.2	1:54.6		2		9			2	
4.		:14.2	1:57.2	2	1		6			2	
5.	x	:26.5	1:05.9				3				
6.		:06.9	:48.6	1			1				
7.		:13.9	:51.6	1			2				
8.	x	:14.3	:35.5								
9.	x	:15.6	:59.6				2				
10.		:29.8	1:46.5	2	1	1	1				
11.		:06.4	:40.0	1			1				
12.	x	:12.2	:40.5				1				
13.	x	:25.5	:51.2				1			1	
14.	x	:20.3	:31.5								
15.	x	:09.2	:20.4								
16.	x	:06.6	:26.8							1	
17.	x	:09.0	:14.6								
18.	x	:09.1	:37.6				1				
19.	x	:18.9	:30.0								
20.		:05.1	:17.9								

TABLE CXXXVIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR LT-ISO-503

Trial	ET	Variables TES	TT	CPE	RE	R	HB	G	D	S	NE
1.		20:00.0	20:00.0		2		4	1		11	x
2.		20:00.0	20:00.0		1		2			2	x
3.		15:00.0	15:00.0				1				x
4.		15:00.0	15:00.0				1			1	x
5.		10:00.0	10:00.0				1		x		x
6.		10:00.0	10:00.0				1				x
7.		5:00.0	5:00.0				1				x
8.		5:00.0	5:00.0				1				x

TABLE CXXXIX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR LT-ISO-504

Trial	ET	Variables									
		TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		2:31.8	6:59.2	4	2		10		x	9	x
2.		2:46.6	6:45.4	3	5		12			3	x
3.		20:00.0	20:00.0		1		3				x
4.		20:00.0	20:00.0				1				x
5.		15:00.0	15:00.0				1				x
6.		15:00.0	15:00.0				1				x
7.		10:00.0	10:00.0		1		3	1		1	x
8.		10:00.0	10:00.0				1				x

TABLE CXL

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-MC-COL-B

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		:03.5	3:09.1	2	1		13	2		2	x
2.		3:41.8	12:04.2	2	5		26	4		1	x
3.		1:06.2	20:00.0	2	10		27	3	x	1	x
4.		1:12.4	12:04.8	2	6		14	2			x
5.		:49.3	7:43.4	4	7		25	2			x
6.	x	:06.2	:37.0				4				
7.	x	:02.8	:17.5				2				
8.		:02.3	:29.5	1			2				
9.		:04.8	:28.4	1			1				
10.	x	:04.1	:30.6				1				
11.	x	:03.4	:12.0				1				
12.	x	:02.6	:10.5								
13.	x	:23.9	:57.2				2				
14.	x	:02.6	:11.3								
15.	x	:04.7	:12.7				1				
16.	x	:01.4	:10.8								
17.	x	:04.2	:25.4								
18.	x	:02.2	:22.5				1				
19.		:05.1	:53.3	2	1		4				
20.	x	:02.9	:18.4				1	1			

TABLE CXLI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-MC-COL-N

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		20:00.0	20:00.0				2		x		x
2.		20:00.0	20:00.0				1				x
3.		9:21.8	15:00.0	3	3		8	1			x
4.		15:00.0	15:00.0				1				x
5.		2:10.1	5:00.5	3	1		12	1			
6.		10:00.0	10:00.0				1	1			x
7.		:49.6	2:19.8	1	1		6			1	
8.	x	:21.3	:48.1				4			1	
9.		:46.3	1:49.6	1			4			1	
10.	x	:30.8	1:15.7				4			2	
11.	x	:38.2	1:50.6				2				
12.	x	:16.8	:36.3				3				
13.	x	:21.3	:39.1				1				
14.	x	:26.7	:36.5							2	
15.	x	:17.2	:34.4							1	
16.		:16.4	:52.5	1			1				
17.	x	:24.9	:30.1				1				
18.	x	:10.1	:25.3				1				
19.	x	:11.0	:24.8								
20.	x	:12.5	:33.4				2				

TABLE CXLII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-MC-COL-R

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	:53.4	2:08.6	2			8			1	x
2.	:08.4	20:00.0		6		17	1			x
3.	:30.6	14:08.0	1	3		13	2			
4.	:31.0	12:59.5	4	4		12	1			x
5.	:24.6	1:48.5	1	1		10				x
6.	3:14.4	11:01.9	1	3		13	2			x
7.	1:02.8	14:08.1		5		21	3			x
8.	:55.6	3:07.9	1	3		7	3			
9.	6:51.6	6:14.7		1		7	1			x
10.	2:53.4	3:30.3		1		5	1			x
11.	1:48.9	3:04.1	1			6	1		3	x
12.	6:53.4	9:00.7		1		11			1	x

TABLE CXLIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-MC-COL-L

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	:55.6	13:43.4	9	7		36			1	x
2.	3:31.7	20:00.0	1	4		17	1		1	x
3.	20:00.0	20:00.0				1	1			x
4.	15:00.0	15:00.0				1				x
5.	15:00.0	15:00.0				1				x
6.	9:21.7	11:36.4	3			6				
7.	1:14.3	6:00.0	1			3				x

TABLE CXLIV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-MC-COL-N

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	3:24.9	20:00.0	1	1	3	4	1	x	4	x
2.	20:00.0	20:00.0				1		x		x
3.	15:00.0	15:00.0				1				x
4.	15:00.0	15:00.0		2		4	2	x		x
5.	10:00.0	10:00.0				1		x		x
6.	10:00.0	10:00.0						x		x
7.	:41.8	1:45.8	4			6		x	7	x
8.	:39.6	5:00.0	1	2		5		x	2	x
9.	5:00.0	5:00.0				1	3		1	x

TABLE CXLV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-MC-COL-B

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	:14.0	20:00.0	3	4	1	9	3		6	x
2.	:16.8	18:40.1	3	1	1	2		x		x
3.	20:00.0	20:00.0				1				x
4.	15:00.0	15:00.0				2		x		x
5.	10:00.0	10:00.0				1				x
6.	1:55.5	10:00.0	2	3	1	9	1	x	3	x
7.	5:04.5	7:54.6	2	3		12	3	x		x

TABLE CXLVI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-MC-COL-R

Trial	ET	Variables TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:20.5	7:42.6	6	6		10	3		8	
2.		:55.6	20:00.0	3	5		5	2			x
3.		20:00.0	20:00.0		3		7	3			x
4.		15:00.0	15:00.0				2				x
5.		15:00.0	15:00.0		1		3	1			x
6.		:07.6	1:44.7	3			5		x	3	x
7.		:04.2	:52.6	1			5	1	x	1	x
8.		:22.7	3:58.4	1	3		15	2		1	
9.		:11.2	2:54.8	1	1		13	1		1	
10.	x	:14.3	:50.1				6				
11.		1:37.2	2:20.9	2	1		3	2			
12.		1:29.6	2:46.7				7	2			
13.		:14.2	1:41.2	2			6				
14.	x	1:47.6	3:07.4				5	1			
15.	x	1:21.4	5:32.6				5				

TABLE CXLVII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-MC-COL-L

		Variables									
Trial	ET	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.		1:07.1	20:00.0	1	1	11	1	5	x	6	x
2.		:18.3	20:00.0	2	2		6		x	7	x
3.		15:00.0	15:00.0		1		1		x	1	x
4.		15:00.0	15:00.0								x
5.		10:00.0	10:00.0						x		x
6.		:09.6	1:19.8	1			7			2	
7.		:08.4	5:00.9	4	3		17			3	
8.		:06.3	5:00.0	2	3		7	1			x
9.		:10.2	1:24.2	1			6				
10.	x	:04.9	:30.7				3				
11.		:37.6	3:36.7	1	1		8	1			
12.		5:00.0	5:00.0		1		2				x

TABLE CXLVIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-MC-ISO-601

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	1:07.3	6:09.0	4	4	3	8			2	x
2.	1:29.8	20:00.0	1	4		9	1	x	1	x
3.	20:00.0	20:00.0		5		13	2	x		x
4.	15:00.0	15:00.0		2	1	5	1			x
5.	15:00.0	15:00.0				1				x
6.	10:00.0	10:00.0		2		5	2	x		x
7.	10:00.0	10:00.0		1	1	2				x
8.	5:00.0	5:00.0		1		3				x

TABLE CXLIX

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-MC-ISO-602

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	2:11.6	9:17.2	7	4	4	17		x	5	x
2.	1:39.4	7:46.1	4	6	5	18	2		1	x
3.	:41.3	8:24.4	3	3		15				x
4.	20:00.0	20:00.0				2		x		x
5.	20:00.0	20:00.0				1		x		x
6.	15:00.0	15:00.0				1		x		x
7.	15:00.0	15:00.0				1				x
8.	10:00.0	10:00.0				1				x

TABLE CL

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-MC-ISO-603

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	1:40.4	20:00.0	3	5	1	15			2	x
2.	20:00.0	20:00.0		1	1	5		x		x
3.	15:00.0	15:00.0				1		x		x
4.	15:00.0	15:00.0				2		x		x
5.	10:00.0	10:00.0				1				x
6.	10:00.0	10:00.0				1				x
7.	5:00.0	5:00.0				1				x
8.	5:00.0	5:00.0				1				x

TABLE CLI

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR UT-MC-ISO-604

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	1:02.5	4:39.0	3	2		19		x	1	x
2.	:22.6	20:00.0	2	2		7		x		x
3.	:46.9	19:58.1	4	3	1	13	1			x
4.	20:00.0	20:00.0				1				x
5.	15:00.0	15:00.0				1		x		x
6.	15:00.0	15:00.0				1				x
7.	6:00.0	6:00.0				1				x
8.	5:00.0	5:00.0				1				x

TABLE CLII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-MC-ISO-701

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	1:46.8	20:00.0	2	2		5	1	x	8	x
2.	:14.6	20:00.0	3	2		4	1	x	4	x
3.	15:00.0	15:00.0		2		3		x		x
4.	15:00.0	15:00.0				2				x
5.	10:00.0	10:00.0				2				x
6.	10:00.0	10:00.0				1				x
7.	5:00.0	5:00.0				1				x
8.	5:00.0	5:00.0								x

TABLE CLIII

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-MC-ISO-702

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	1:31.8	4:57.4	5	1		9		x	7	x
2.	:02.6	1:02.5	2			4		x	1	x
3.	:03.2	3:25.5	2	1	1	6			1	x
4.	:04.6	20:00.0				4	1	x	2	x
5.	20:00.0	20:00.0		1		3		x		x
6.	15:00.0	15:00.0				1				x
7.	10:00.0	10:00.0				1		x		x
8.	10:00.0	10:00.0								x

TABLE CLIV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-MC-ISO-703

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	20:00.0	20:00.0			1	1		x	7	x
2.	20:00.0	20:00.0				1		x	1	x
3.	15:00.0	15:00.0				1			2	x
4.	15:00.0	15:00.0				1		x		x
5.	10:00.0	10:00.0				1		x		x
6.	10:00.0	10:00.0				1		x		x
7.	5:00.0	5:00.0							1	x
8.	5:00.0	5:00.0				1				x

TABLE CLV

RESPONSES PER VARIABLE ON EACH ELEVATED MAZE TRIAL FOR RB-MC-ISO-704

Trial	Variables									
	TFS	TT	CPE	RE	R	HB	G	D	S	NE
1.	20:00.0	20:00.0				1		x	5	x
2.	20:00.0	20:00.0				1		x	2	x
3.	15:00.0	15:00.0				1		x	1	x
4.	15:00.0	15:00.0				1		x	1	x
5.	3:46.8	10:00.0	1	2		7		x	4	x
6.	4:41.3	6:10.9				6			2	x
7.	10:00.0	10:00.0				1				x
8.	5:00.0	5:00.0				1				x

TABLE CLVI

WEIGHTS AT COMPLETION OF ELEVATED MAZE
FOR ANIMAL ROOM SS

Ss	Weight in grams
UT-AR-Col-1	
L	248
N	266
R	250
UT-AR-Col-2	
B	254
N	260
R	242
L	194
RB-AR-Col	
L	236
N	266
B	280
R	278
UT-AR-Iso	
100	162
101	192
34-H	164
4-H	168
RB-AR-Iso	
301	228
302	218
303	210
304	226
UT-AR-Sp	
L	210
R	208

TABLE CLVII

WEIGHTS AT COMPLETION OF ELEVATED MAZE TRIALS
FOR REDUCED STIMULATION SS

Ss	Weight in grams
UT-RS-Col	
B	262
N	262
L	266
R	296
RB-RS-Col-2	
R	294
B	254
N	280
L	272
RB-RS-Col-3	
R	242
B	262
N	212
L	172
UT-RS-Iso	
20-H	214
220	202
9-H	208
204	206
201	222
206	204
RB-RS-Iso	
401	198
402	284
403	240
UT-RS-Sp	
L	188
R	208

TABLE CLVIII

WEIGHTS AT COMPLETION OF ELEVATED MAZE TRIALS FOR LATE TREATMENT SS

Ss	Weight in grams
RB-LT-Col-4	
B	282
R	248
N	248
RB-LT-Iso	
501	226
502	248
503	178
504	232

TABLE CLIX

WEIGHTS AT COMPLETION OF ELEVATED MAZE TRIALS FOR MAZE CONTROL SS

Ss	Weight in grams
UT-MC-Col-4	
N	174
B	238
R	262
L	192
RB-MC-Col-5	
L	285
B	290
N	324
R	358
UT-MC-Iso	
601	324
602	322
603	284
604	240
RB-MC-Iso	
701	256
702	246
703	260
704	352

APPENDIX B

TABLE CLX

COMPARISON OF UT ANIMAL ROOM COLONY WITH UT ANIMAL ROOM ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	AR-Col	76		99		157		296		163		901	
GE	AR-Iso	82		148		124		396		320		1042	
	AR-Col	16		22		39		54		34		173	
R	AR-Iso	14		26		14		60		48		160	
	AR-Col	6		14		19		25		36		103	
HB	AR-Iso	4		14		15		23		29		92	
	AR-Col	0		1190		430		360		220		1820	
I	AR-Iso	40		750		740	.20	120		85		1805	
	AR-Col	0		3		3		7		4		16	
G	AR-Iso	0		2		2		9		3	.20	18	
	AR-Col	0		0		0		0		0		1	
D	AR-Iso	0		0		0		0		0		0	

TABLE CLXI

COMPARISON OF RB ANIMAL ROOM COLONY WITH RB ANIMAL ROOM ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS OF OPEN FIELD BEHAVIOR

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	AR-Col	174		165		233		182		70		892	
GE	AR-Iso	128	.20	138		136		405	.20	152	.15	998	
	AR-Col	30		39		40		40		22		194	
R	AR-Iso	21		30		32		82		52	.10	331	
	AR-Col	16		40		40		38		20		170	
HB	AR-Iso	16		31		42		62	.175	52	.10	218	
	AR-Col	10		1055		952		1048		668		3540	
I	AR-Iso	0		1102		1015		458	.10	292	.10	2870	
	AR-Col	2		2		2		1		0		5	
G	AR-Iso	0	.10	3		1		2		1	.05	8	
	AR-Col	1		4		2		2		1		8	
D	AR-Iso	0		4		1		0		0		5	

TABLE CLXII

COMPARISON OF UT REDUCED STIMULATION COLONY WITH UT REDUCED STIMULATION ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	RS-Col	72		368		545		364		317		1672	
GE	RS-Iso	90		230	.02	227	.01	408		399		1418	
	RS-Col	8		50		76		30		42		206	
R	RS-Iso	16	.04	21	.05	32	.01	48	.07	62	.02	188	.15
	RS-Col	5		30		40		35		37		146	
HB	RS-Iso	10	.035	28		26	.05	40		38		144	
	RS-Col	45		270		90		440		90		920	
I	RS-Iso	10		250		410		155	.05	30	.15	920	
	RS-Col	0		1		1		1		1		6	
G	RS-Iso	0		0		1		0		3	.10	6	
	RS-Col	1		2		2		2		0		8	
D	RS-Iso	0	.14	1		0	.035	1	.05	0		1	.075

TABLE CLXIII

COMPARISON OF RB REDUCED STIMULATION COLONY WITH REDUCED STIMULATION ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	RS-Col	100		252		276		280		148		956	
GE	RS-Iso	109		67	.04	122		243	.05	120		666	
	RS-Col	17		36		61		64		34		220	
R	RS-Iso	26	.15	17		15	.10	26	.20	19	.15	76	.15
	RS-Col	10		44		53		49		36		191	
HB	RS-Iso	13	.20	26	.05	30	.05	56		36		189	
	RS-Col	65		872		772		832		522		3208	
I	RS-Iso	20		1260	.04	1080	.04	880		615		3545	.04
	RS-Col	2		8		7		5		8		32	
G	RS-Iso	0	.10	2	.01	2	.20	2	.15	0	.05	6	.05
	RS-Col	1		4		1		1		0		6	
D	RS-Iso	1		4		2	.10	1		0		7	

TABLE CLXIV

COMPARISON OF LATE TREATMENT COLONY WITH LATE TREATMENT ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS IN THE OPEN FIELD

		Trials											
		1		2-6		7-11		12-16		17-19		Total	
Var	Group	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P	Mdn	P
	LT-Col	100		178		156		372		87		786	
GE	LT-Iso	164	.10	502	.20	448		622	.10	179		1796	
	LT-Col	21		23		58		76		23		192	
R	LT-Iso	32	.10	68		90		132	.10	27		339	
	LT-Col	19		41		34		57		24		193	
HB	LT-Iso	24		56		52		61		44		216	
	LT-Col	40		1140		1060		570		645		3745	
I	LT-Iso	0	.10	305		620		252	.10	505		1760	
	LT-Col	2		2		5		5		1		16	
G	LT-Iso	0	.20	6	.20	4		2		1		15	
	LT-Col	1		2		0		0		0		3	
D	LT-Iso	1		2		1		1		1		7	

TABLE CLXV

COMPARISON OF UT ANIMAL ROOM COLONY WITH UT ANIMAL ROOM ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	AR-Col	3:26.7		:20.4		4:50.7	
	AR-Iso	:55.8	.02	:23.7		3:56.6	
Total maze time	AR-Col	8:03.4		1:15.2		17:52.3	
	AR-Iso	14:10.0		1:10.3		22:41.2	
Errorless trials	AR-Col			4		11	
	AR-Iso			4		11.5	
Choice point errors	AR-Col	8		0		10	
	AR-Iso	10	.175	0		20	.075
Retrace errors	AR-Col	7		0		10	
	AR-Iso	9.5	.02	0		12	.175
Head bobbing	AR-Col	14		2		25	
	AR-Iso	.5	.01	2		22	
Grooming	AR-Col	0		0		0	
	AR-Iso	0		0		0	
Defecation	AR-Col	0		0		0	
	AR-Iso	0		0		0	
Stability	AR-Col	0		0		6	
	AR-Iso	9	.02	0		13	.175

TABLE CLXVI

COMPARISON OF RB ANIMAL ROOM COLONY WITH RB ANIMAL ROOM ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables[a]	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	AR-Col	6:01.3				10:36.2	
	AR-Iso	11:04.3				43:54.8	
Total maze time	AR-Col	16:29.5				34:35.0	
	AR-Iso	30:10.0				81:47.2	
Errorless trials	AR-Col					10	
	AR-Iso					4.5	
Head bobbing	AR-Col	29				74	
	AR-Iso	20.5				40	.10
Grooming	AR-Col	1				2	
	AR-Iso	1.5				3	
Defecation	AR-Col	0				0	
	AR-Iso	0				0	

[a]Variables choice point errors, retrace errors, and stability were not included due to the inertness of Ss.

TABLE CLXVII

COMPARISON OF UT REDUCED STIMULATION COLONY WITH UT REDUCED STIMULATION ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	RS-Col	3:20.0		3:25.0		14:37.1	
	RS-Iso	4:25.5		2:32.3		27:44.1	
Total maze time	RS-Col	10:02.1		4:05.4		25:18.1	
	RS-Iso	12:58.1		3:50.2		63:50.8	
Errorless trials	RS-Col			3.5		10	
	RS-Iso			3		8	
Choice point errors	RS-Col	12		0		19	
	RS-Iso	9		0		14	
Retrace errors	RS-Col	6.5		0		10	
	RS-Iso	7		0		19.5	
Head bobbing	RS-Col	24.5		8.5		69.5	
	RS-Iso	7	.01	6.5		48	.20
Grooming	RS-Col	1.5		0		2.5	
	RS-Iso	0		0		2	
Defecation	RS-Col	0		0		0	
	RS-Iso	1		0		1	.05
Stability	RS-Col	9.5		1		15	
	RS-Iso	15	.20	0		20	.20

TABLE CLXVIII

COMPARISON OF RB REDUCED STIMULATION COLONY WITH RB REDUCED STIMULATION ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

		Trials					
		1-4		17-20		Total	
Variables[a]	Group	Mdn	P	Mdn	P	Mdn	P
Time first section	RS-Col	29:51.6				61:29.8	
	RS-Iso	4:03.1				29:38.2	
Total maze time	RS-Col	38:40.4				93:49.3	
	RS-Iso	12:27.1				79:35.5	
Errorless trials	RS-Col					10	
	RS-Iso					4.5	
Head bobbing	RS-Col	24				54	
	RS-Iso	31	.035			75	
Grooming	RS-Col	3.5				8	
	RS-Iso	0	.20			4	
Defecation	RS-Col	.5				1	
	RS-Iso	0				1	

[a]Variables choice point errors, retrace errors, and stability were not included due to inertness of Ss.

TABLE CLXIX

COMPARISON OF LATE TREATMENT COLONY WITH LATE TREATMENT ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE

Variables[a]	Group	Trials 1-4 Mdn	Trials 1-4 P	Trials 17-20 Mdn	Trials 17-20 P	Total Mdn	Total P
Time first section	Col	23:51.2				81:47.6	
	Iso	9:00.6				69:27.6	
Total maze time	Col	33:30.9				100:00.0	
	Iso	19:52.1				100:00.0	
Errorless trials	Col					.5	
	Iso					4	
Head bobbing	Col	27				37	
	Iso	29				65	
Grooming	Col	1				2	
	Iso	0				1	
Defecation	Col	0				0	
	Iso	.5				1	

[a]Variables choice point error, retrace error, and stability were not included due to inertness of Ss.

TABLE CLXX

COMPARISON OF MAZE CONTROL COLONY WITH MAZE CONTROL ISOLATES ON FREQUENCY OF COMBINED VARIABLES ACROSS ALL TRIALS ON ELEVATED MAZE[a]

Variables	Group	Trials 1-4 Mdn	P
Time first section	Col	33:28.1	
	Iso	34:49.2	
Total maze time	Col	69:21.7	
	Iso	67:19.0	
Errorless trials	Col	0	
	Iso	0	
Head bobbing	Col	18.5	
	Iso	18.5	
Grooming	Col	4	
	Iso	1	.005
Defecation	Col	.5	.15
	Iso	3	

[a]Comparisons for trials 17-20 and total, and for variables choice point errors, retrace errors, and stability were not included due to inertness of Ss.

TABLE CLXXI

MEAN NUMBER OF GRID ENTRIES FOR ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ACROSS ALL TRIALS

Trial	Group		
	Animal Room	Reduced Stimulation	Late Treatment
1.	98.0	93.1	150.7
2.	54.5	58.0	75.0
3.	25.4	45.5	46.0
4.	22.9	26.4	99.9
5.	30.9	39.6	68.9
6.	28.7	54.0	78.3
7.	46.3	49.7	87.0
8.	47.6	61.3	80.6
9.	36.9	65.0	72.7
10.	37.1	70.5	34.4
11.	30.6	51.5	53.1
12.	64.2	73.7	124.1
13.	69.1	65.1	109.4
14.	62.9	61.6	101.0
15.	62.3	77.1	76.0
16.	54.9	65.3	87.6
17.	59.0	91.4	91.6
18.	55.5	95.6	67.4
19.	62.6	80.2	77.1

TABLE CLXXII

MEAN DURATION OF INERTNESS FOR ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ACROSS ALL TRIALS

Trial	Group		
	Animal Room	Reduced Stimulation	Late Treatment
1.	40.0	50.9	20.0
2.	114.3	106.9	91.0
3.	204.8	146.1	172.9
4.	191.9	187.0	91.4
5.	177.8	142.2	121.4
6.	180.7	117.0	105.7
7.	113.8	131.9	90.1
8.	109.3	112.6	126.4
9.	171.9	96.3	150.0
10.	151.4	89.1	185.0
11.	185.0	116.9	165.0
12.	99.0	75.9	62.1
13.	94.0	111.1	79.3
14.	92.6	133.5	85.0
15.	72.6	96.3	112.3
16.	121.7	102.2	102.9
17.	120.0	98.7	135.7
18.	114.5	109.6	192.1
19.	123.1	95.2	124.3

TABLE CLXXIII

MEAN HEAD BOBBING RESPONSES FOR ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ACROSS ALL TRIALS

Trial	Group		
	Animal Room	Reduced Stimulation	Late Treatment
1.	9.7	8.9	18.3
2.	6.8	6.0	11.1
3.	4.3	5.3	7.9
4.	4.4	4.6	18.6
5.	5.4	7.4	9.6
6.	5.0	8.6	12.6
7.	5.9	7.6	11.4
8.	6.3	7.1	9.7
9.	5.6	9.2	13.0
10.	4.9	8.6	7.7
11.	5.4	7.9	7.1
12.	6.3	9.5	9.1
13.	8.0	8.6	13.3
14.	8.0	9.0	17.0
15.	8.4	7.1	10.1
16.	7.2	11.8	13.3
17.	11.4	12.0	15.1
18.	10.8	13.3	6.1
19.	11.9	11.6	15.9

TABLE CLXXIV

MEAN NUMBER OF REARS FOR ANIMAL ROOM, REDUCED STIMULATION, AND LATE TREATMENT GROUPS ACROSS ALL TRIALS

Trial	Groups		
	Animal Room	Reduced Stimulation	Late Treatment
1.	17.2	16.8	30.0
2.	10.3	8.4	17.4
3.	4.5	6.4	12.3
4.	4.9	2.9	19.4
5.	5.6	5.7	14.1
6.	5.8	8.3	17.4
7.	7.7	6.8	21.0
8.	10.9	9.6	21.4
9.	6.9	11.2	13.6
10.	6.7	11.7	9.1
11.	4.4	9.7	13.3
12.	11.4	11.4	32.6
13.	12.6	10.2	21.1
14.	12.0	8.8	17.0
15.	13.0	13.8	17.9
16.	16.2	13.5	24.7
17.	12.0	15.4	14.4
18.	11.2	14.8	12.3
19.	12.9	12.3	17.4